DOCUMENT RESUME

ED 254 986 EC 172 037

AUTHOR Dixon, Margaret Electa
TITLE Questioning Strategy Instruction Participation and Reading Comprehension of Learning Disabled Students.
INSTITUTION Arizona Univ., Tucson. Dept. of Special Education.
SPONS AGENCY Special Education Programs (ED/OSERS), Washington, DC.
PUB DATE Sep 83
GRANT G008202521
NOTE 137p.; Ph.D. Dissertation, University of Arizona.
PUB TYPE Dissertations/Theses - Doctoral Dissertations (041) -- Reports - Research/Technical (143)

EDRS PRICE MF01/PC06 Plus Postage.
DESCRIPTORS Inservice Teacher Education; Intermediate Grades; *Learning Disabilities; *Questioning Techniques; *Reading Comprehension; *Reading Instruction; Resource Teachers; Teacher Workshops

ABSTRACT

Ten randomly selected resource teachers participated in a five-weekend workshop course on questioning strategies, designed to help them ask higher cognitive level questions. Students were 60 learning disabled fifth and sixth graders with reading difficulties. A mini-computer collected observational data reflecting student-teacher interaction (discussion) following the reading of a narrative story. Techniques taught to the students focused on oral discussion. Written comprehension tests were administered before and after the workshops as well as 1 month after. Results indicated significant differences between workshop teachers and control group; workshop teachers asked significantly higher level questions. Students responded with higher level answers. There was no difference between the two groups in their performance on written comprehension tests, suggesting the difficulties LD students have transferring oral skills to written tasks. (Author/CL)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED254986

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION
CENTER (ERIC)
☒ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

QUESTIONING STRATEGY INSTRUCTION, PARTICIPATION AND READING COMPREHENSION OF LEARNING DISABLED STUDENTS

by

Margaret Electa Dixon

A Dissertation Submitted to the Faculty of the

DEPARTMENT OF SPECIAL EDUCATION

In Partial Fulfillment of the Requirements
For the Degree of

DOCTOR OF PHILOSOPHY

In the Graduate College

THE UNIVERSITY OF ARIZONA

1983

FINANCIAL STATUS REPORT

(Follow instructions on the back)

1. FEDERAL AGENCY AND ORGANIZATIONAL ELEMENT TO WHICH REPORT IS SUBMITTED	2. FEDERAL GRANT OR OTHER IDENTIFYING NUMBER	OMB Approved No. 80-R0180	PAGE	OF
Department of Education	G008202521		1	1 PAGE

3. RECIPIENT ORGANIZATION (Name and complete address, including ZIP code)	4. EMPLOYER IDENTIFICATION NUMBER	5. RECIPIENT ACCOUNT NUMBER OR IDENTIFYING NUMBER	6. FINAL REPORT	7. BASIS
University of Arizona SUPO 21042 Tucson, Arizona 85720	866004791	848435	XX YES ☐ NO	☒ CASH ☐ ACCRUA

8. PROJECT/GRANT PERIOD (See instructions)		9. PERIOD COVERED BY THIS REPORT	
FROM (Month, day, year)	TO (Month, day, year)	FROM (Month, day, year)	TO (Month, day, year)
01/01/83	09/30/83	01/01/83	09/30/83

10. STATUS OF FUNDS

PROGRAMS/FUNCTIONS/ACTIVITIES ►	(a) Direct	(b) Indirect	(c)	(d)	(e)	(f)	TOTAL (g)
a. Net outlays previously reported	$ -0-	$	$	$	$	$	$
b. Total outlays this report period	11,471						
c. *Less:* Program income credits	-0-						
d. Net outlays this report period (*Line b minus line c*)	11,471						
e. Net outlays to date (*Line a plus line d*)	11,471						
f. *Less:* Non-Federal share of outlays	-0-						
g. Total Federal share of outlays (*Line e minus line f*)	11,471						
h. Total unliquidated obligations	-0-						
i. *Less:* Non-Federal share of unliquidated obligations shown on line h	-0-						
j. Federal share of unliquidated obligations	-0-						
k. Total Federal share of outlays and unliquidated obligations	11,471						
l. Total cumulative amount of Federal funds authorized	11,521						
m. Unobligated balance of Federal funds	50						

11. INDIRECT EXPENSE	a. TYPE OF RATE (Place "X" in appropriate box) ☐ PROVISIONAL ☐ PREDETERMINED ☐ FINAL ☐ FIXED	b. RATE	c. BASE	d. TOTAL AMOUNT	e. FEDERAL SHARE
		N/A			

12. REMARKS: *Attach any explanations deemed necessary or information required by Federal sponsoring agency in compliance with governing legislation*

13. CERTIFICATION

I certify to the best of my knowledge and belief that this report is correct and complete and that all outlays and unliquidated obligations are for the purposes set forth in the award documents.

SIGNATURE OF AUTHORIZED CERTIFYING OFFICIAL: Janet M. Hornung

TYPED OR PRINTED NAME AND TITLE: Janet M. Hornung, Contract

DATE REPORT SUBMITTED: FEB 09 1984

TELEPHONE (Area code, number and extension): 602 626-3171

SF 269 (OE FORM 411-1, 6/80)

Acc... FORM 269 (7-76)
Pre... Circ. A-102) Office of Management and Budget
Ch. No. A-110

ST COPY AVAILABLE

THE UNIVERSITY OF ARIZONA
GRADUATE COLLEGE

As members of the Final Examination Committee, we certify that we have read the dissertation prepared by Margaret Dixon

entitled Questioning Strategy Instruction Participation And Reading Comprehension Of Learning Disabled Students

and recommend that it be accepted as fulfilling the dissertation requirement for the Degree of _____.

Jerome V. McCarthy	9-7-83 Date
Candace A. Bos	September 7, 1983 Date
Judy Richards Ditchell	9-7-83 Date
	Date
	Date

Final approval and acceptance of this dissertation is contingent upon the candidate's submission of the final copy of the dissertation to the Graduate College.

I hereby certify that I have read this dissertation prepared under my direction and recommend that it be accepted as fulfilling the dissertation requirement.

Jerome V. McCarthy	9-14-83
Dissertation Director	Date

BEST COPY AVAILABLE

STATEMENT BY AUTHOR

This dissertation has been submitted in partial fulfillment of requirements for an advanced degree at The University of Arizona and is deposited in the University Library to be made available to borrowers under rules of the Library.

Brief quotations from this dissertation are allowable without special permission, provided that accurate acknowledgment of source is made. Requests for permission for extended quotation from or reproduction of this manuscript in whole or in part may be granted by the copyright holder.

SIGNED: _____

ACKNOWLEDGMENTS

I wish to thank the members of my committee for support and cooperation during this study. A thank you for Dr. Jeanne McCarthy who allowed and encouraged me to pursue my own research interests and provided valuable editorial assistance during the final phases of this dissertation. A thank you to Dr. Candace Bos who asked important questions in the initial stages that helped in making decisions concerning the design and the procedures that were adopted. In the final writing phases she provided detailed feedback that was needed in focusing for this writing stage. A thank you to Dr. Judy Mitchell, from the Department of Reading, for her continued enthusiasm for this research. She provided early assistance in analyzing narrative text, as well as other considerations like student interest and background knowledge so important in the comprehension process. In the final editing stages she suggested specific ideas concerning chunks of description that were initially left out.

I am grateful for the persistent assistance and willingness of Irene Topor who spent hours testing students, scoring tests, and coding TICOR reliability tapes. Her dependability and encouragement will always be cherished.

A special thanks to all the principals, teachers and students who allowed me to come into their classrooms and observe the interaction that occurred during group discussions. I have developed a profound

respect for these teachers' professional attitude and eagerness to improve their own skills.

I wish to thank Dr. Delva Daines, Mrs. Joan Rossi, Dr. Francis Hunkins, Dr. John Bradley, and Dr. Donald Deshler in supporting this student research by presenting instruction during the five weekend workshops.

Appreciation goes to K. Steven Hansen at Brigham Young University who assisted in programming for and processing the data collected by TICOR. Appreciation also goes to Dave Anderson and Suzanne Lane for assistance in analyzing the written comprehension components of the study, as well as the data obtained from TICOR.

Further, I wish to thank my family for their continued support and encouragement. A very special appreciation is expressed to my mother who taught me to always try my best, to establish goals and to be consistent in striving to accomplish those goals.

TABLE OF CONTENTS

	Page
LIST OF TABLES	viii
LIST OF ILLUSTRATIONS	ix
ABSTRACT	x
1. INTRODUCTION	1
Statement of Problem	4
Questions to be Answered	4
Definitions of Terms	6
Limitations	9
2. REVIEW OF LITERATURE	11
Reading Comprehension	11
Questioning in Relation to Reading	17
The Role of Question Strategies	19
Successful Questioning Strategies	22
Placement of the Questions	22
Types of Questions	23
Student Generated Questions	24
Questioning and Related Strategies with Learning Disabled Students	27
3. DESIGN OF THE STUDY	31
Pilot Study	32
Subjects	32
Procedure	32
Results and Implications	34
Main Study	35
Subjects	35
Materials and Instrumentation	39
Procedures	44
Scoring the Data	49
Analysis of Data	56
4. RESULTS	58
Question 1	60
Question 2	65

TABLE OF CONTENTS--Continued

Page

Question 3 69
Question 4 71
Question 5 71
Question 6 73
Question 7 73
Interscorer Reliability 74
Summary 76

5. SUMMARY, DISCUSSION AND IMPLICATIONS 77

Summary 77
Subjects 79
Materials and Instrumentation 80
Procedures 80
Scoring the Data 80
Results 81
Discussion 81
Implications for Education 89
Implications for Research 90
Re-examination of the Data 90
Further Research 90

APPENDIX A: TEACHER DATA SHEETS 92

APPENDIX B: DISTRICT PLACEMENT GUIDELINES 94

APPENDIX C: MICROCOMPUTER APPLICATIONS IN INTERACTION ANALYSIS 95

APPENDIX D: TEST 96

APPENDIX E: QUESTION FORM 97

APPENDIX F: RANDOM ORDER OF STORIES USED FOR DISCUSSION . . . 98

APPENDIX G: SAMPLE USED FOR INSTRUCTION IN LABELING QUESTIONS 99

APPENDIX H: STORIES USED FOR WRITTEN TESTS 100

APPENDIX I: WORKSHOP 1--BLOOM'S TAXONOMY 101

APPENDIX J: WORKSHOP 2--QUESTION STRATEGY 107

TABLE OF CONTENTS--Continued

Page

APPENDIX K: TABA'S COGNITIVE THINKING LEVELS 113

APPENDIX L: WORKSHOP 5--LEARNING STRATEGIES 114

APPENDIX M: RECORDING FORMS FOR INTERRATER RELIABILITY FOR COMPREHENSION 115

APPENDIX N: RECORDING FORMS FOR INTERRATER RELIABILITY FOR SELF-QUESTIONING 116

APPENDIX O: INTERRATER RELIABILITY DATA SUMMARY 117

REFERENCES 118

LIST OF TABLES

Table		Page
1.	Thinking Levels that Translate into a Hierarchy of Questioning Levels	7
2.	Teacher Characteristics of Experimental and Control Groups	37
3.	Student Characteristics of Experimental and Control Groups	40
4.	Sample of TICOR Printout	42
5.	Description of Workshops	50
6.	Multivariate Analysis of Variance of Teacher Questions per Minute for Critical Level I and II Questions	62
7.	Pre and Posttesting on Critical I and II Questions for the Experimental and Control Teachers	63
8.	Multivariate Analysis of Variance of Student Response Participation per Minute and Percent of Time Duration for Critical I and Critical II Questions	66
9.	Pre, Post, and Maintenance Testing on Critical I and Critical II Responses per Minute for the Experimental and Control Students	68
10.	Percent Duration--Summary of Analysis of Variance	69
11.	Multivariate Analysis of Variance of Written Test Responses	72
12.	Reliability on TICOR Data	74
13.	Reliability of Written Comprehension Tests	75

LIST OF ILLUSTRATIONS

Figure		Page
1.	Piaget's Learning Process Model	13
2.	Analysis of the Seven Research Questions	59
3.	Pre and Posttestings of Means on Critical II Teacher Questions for Experimental and Control Students	64
4.	Student Responses to Critical II Questions	70

ABSTRACT

Learning disabled students have been described as "inactive" learners. They have difficulty organizing their learning environment and seem to lack the awareness of a need to develop methods or strategies to help themselves in accomplishing tasks. Research suggests that learning disabled students are able to learn strategies. In examining the academic area where most of these students have the greatest difficulty, it was found that reading comprehension is the predominate area of need for remediation.

The major purpose of this study was to investigate the effects of using a questioning strategy with learning disabled students to increase discussion participation and to increase reading comprehension. The study had a dual research focus: a teacher training component and a student component. Twenty randomly selected resource teachers were chosen to participate. One-half of these teachers were involved in a five weekend workshop course on questioning strategies where teachers learned how to ask higher cognitive level questions. The other half of the teachers received no training during the study. The 60 students were all learning disabled fifth and sixth graders having difficulty with reading, but reading at least on a third grade level.

The data collection instrument TICCR, a mini-computer, was used to collect observational data reflecting student-teacher interaction (discussion) following the reading of a narrative story.

The techniques taught to the students focused on the oral discussion. Written comprehension tests were administered before and after the workshops as well as one month later. It was found that there were significant differences between the two groups; the teachers in the workshops asked significantly higher cognitive level questions. As this group asked higher level questions, the students would respond with higher level answers. It was also found that there was no difference between the two groups in their performance on the written comprehension tests. Because of the emphasis on the oral discussion skills, this finding seems to demonstrate that learning disabled students have difficulty using strategies acquired through incidental learning and also have difficulty transferring oral skills to written tasks.

CHAPTER 1

INTRODUCTION

Learning disabled children have been described as "inactive" learners (Torgesen, 1977). As Torgesen contrasts the active learner with the inactive learner, he suggests that the active learner has a general cognitive awareness and a purposive goal directedness. This "purposive goal directedness" deals with Torgesen's basic tenet that learning disabled children do not realize that they should think of and use task appropriate strategies to aid their own learning.

The active learner's goal directedness is reflected in his/her motivation (Wong, 1979a). As Wong analyzes Torgesen's view, she states that the motivation (of the active learner) is characterized by an intent to learn that ensures sustained and organized efforts at learning. This intent to learn leads to a plan of action finally yielding efficient purposive learning. This active learner seems also aware of the task demands which facilitate his ability to plan.

Another major characteristic of the L.D. student that describes his/her learning difficulty is a lack of selective attention. This may be in part responsible for the "inactive" learner description. Learning disabled students are unable to focus their attention on the salient features of a task or the information components of material to be learned.

Ross (1976) argues that selective attention may be the variable which separates normal children from learning disabled children. He hypothesizes that this lack of attention may represent a developmental delay. He explains selective attention as the ability to focus on those aspects of a stimulus complex which carry the distinctive feature in any given situation. It may be that learning disabled children are delayed in acquiring this skill. These children then would respond to many stimuli, some not relevant to the task demands, resulting in impulsive, distractible or hyperactive type behavior.

As these characteristics of the L.D. student are described, it is important to look at the academic demands of the school setting and see which specific skill or subject areas are most affected. Gearheart (1981, p. 205) states,

> Difficulties in reading have been associated with learning disabilities to a much greater extent than difficulties in any other single academic area. This fact may be established by reading the works of major authors in the field, by observing students in organized educational programs for the learning disabled, or by analyzing the implications of the accepted national definition of learning disabilities.

Kirk and Elkins (1975) suggest that one way that might help in determining what are the characteristics of learning disabled children is to examine the remedial focus given to these children. In a study designed to determine the predominate focus of remedial efforts, 21 different child service demonstration centers in 21 different states including over 3,000 children reported the major and minor remedial emphasis in specific academic areas. Listed as a major emphasis 61% was reading related, 29% was math related, and 23% was spelling related. "From the figures above, one may conclude that learning disabilities is concerned

with approximately 2/3 remedial or corrective reading and 1/4 arithmetic" (Kirk and Elkins, 1975, p. 33).

Reading involves two basic processes: decoding and comprehension. The decoding process refers to understanding the phoneme-grapheme relationship and involves translation of the printed words into a representation similar to oral language. Decoding skills enable the learner to pronounce words correctly. Comprehension is being able to take meaning from what is written. Smith (1978) talks about it as a person's interaction with his perceptions of the symbols that represent language and meaning and his past experience and knowledge base. Daines (1982) describes it as a communication process. "It involves reconstructing an author's message by using one's prior knowledge relevant to daily events. The knowledge and experience a student brings to what he reads will determine in part how well he can make accurate predictions and comprehend material" (Daines, 1982, p. 3).

Although L.D. students have difficulty in learning to "break the code" or learning to decode words, comprehension seems to be more complex and involves more students. Lerner (1971, p. 295) states, "Disabilities related to comprehension affect many more children than disabilities in decoding. Their difficulties may be associated with language disability, with poor attending capacity, or with a deficit in cognitive and conceptual functioning."

As a regular classroom teacher, a reading specialist and an L.D. resource teacher, this researcher has seen many inactive learning disabled students--students who had severe difficulty in reading comprehension and who had difficulty focusing on the salient features of

material to be learned or gained from the printed material. Because of this and the need presented in literature, the goal of this present research has been to identify a reading strategy that could: (1) improve reading comprehension; (2) aid teachers in involving their students in the learning process; (3) help students focus their attention and organize information they are to learn.

A major strategy that both focuses attention and demands that the child become involved in organizing and setting up the learning environment is the questioning skill or strategy. This study focused on the following question: By providing teachers with question strategy instruction, can it assist learning disabled students in focusing their attention, increase their involvement or participation in the reading process and increase their reading comprehension?

Statement of Problem

The purpose of this investigation was to study the effects of questioning strategy instruction on the involvement and discussion participation of learning disabled students, as well as their reading comprehension. The study sought to determine if training teachers to ask higher level questions would produce increased participation or greater involvement in the reading and learning process.

Questions to be Answered

In posing the following research questions, it is understood that comparisons have been made between an experimental group receiving question strategy instruction, and a control group receiving no instruction. All comparisons on teacher and student performance have been made

between pretest data collected prior to question strategy instruction and posttest data collected following question strategy instruction. In addition, student performance at maintenance testing one month following posttesting was compared with pretest and posttest data.

1. Did the group of teachers who received question strategy instruction ask more critical level (I and II) questions per minute during posttesting than the group of teachers who did not receive such question strategy instruction?

2. Did the group of students whose teachers received question strategy instruction respond with more critical level (I and II) answers per minute during post and maintenance testing than the group of students whose teachers did not receive such question strategy instruction?

3. Did the group of students whose teachers received question strategy instruction spend proportionally more discussion time giving critical level (I and II) answers during the post and maintenance testing than the group of students whose teachers did not receive such question strategy instruction?

4. Did the group of students whose teachers received question strategy instruction spend proportionally more discussion time in discussion participation activities during post and maintenance testing than the group of students whose teachers did not receive such question strategy instruction?

5. Did the group of students whose teachers received question strategy instruction correctly label more questions on the written test at post and maintenance testing than the group of students whose teachers did not receive such question strategy instruction?

6. Did the group of students whose teachers received question strategy instruction correctly answer more written comprehension questions at post and maintenance testing than the group of students whose teachers did not receive such question strategy instruction?

7. Did the group of students whose teachers received question strategy instruction generate more appropriate questions based on a criteria during post and maintenance testing than the group of students whose teachers did not receive such question strategy instruction?

Definition of Terms

Comprehension--an understanding of what is read, gaining meaning from the text. It is "building bridges between the new and the known" (Pearson and Johnson, 1978, p. 24). For the purposes of this study, it will be measured by writing the answers to written questions following the student reading a story.

Higher Levels of Thinking--for the purposes of this study, Bloom's (1956) taxonomy of thinking will be used. Higher levels of thinking refer to all levels above the literal or factual level. (See Table 1 for definitions, responses, and example of questions.)

Learning Strategies--defined as "techniques that will facilitate the acquisition, manipulation, integration, storage and retrieval of information across situations and settings" (Alley and Deshler, 1979, p. 13).

TICOR (Time Interval Categorical Observation Recorder)--TICOR is a minicomputer the size of a small briefcase that was used in the collecting of observational classroom interaction between the students

Table 1. Thinking Levels that Translate into a Hierarchy of Questioning Levels*

Level	Definition	Responses	Sample Questions
Knowledge (Memory), Literal or Factual Level	The emphasis is on recall or the memory process. Responses are usually predictable because the answers are restricted to the information stated in the text.	Responses to these questions include the recall of specific facts, trends and methods, specific ideas, generalizations, and terminology.	1. What was the dog's name? 2. List the ways community workers help us. 3. At what temperature does water freeze?
Critical I Comprehension (Translation)	Translation thinking is quite literal and does not require a discovery of intricate relations, implications or subtle meanings.	Responses to these questions include: (1) The translation of a message; (2) An interpretation of interrelationships among major ideas; (3) The extension of ideas to make an inference or prediction.	1. Examine the picture and tell what you think the story is about. 2. In your own words, explain what the graph is telling us.
Application	Application is the process of taking previously acquired knowledge and comprehension of ideas to solve problems in a new or unique situation. This process involves a minimum of directions or instruction and the questions deal with whole ideas.	Responses to questions at this level require students to use their background knowledge, general information and understanding to solve problems.	1. Study the map of Zog. Illustrate where the bus routes should be and indicate your reasons. 2. Read this passage and circle all nouns.
Analysis	Analysis emphasizes the breaking or dividing of given information or materials into parts. Common words used with analysis are: proof, truth, fact, reason, conclusion, evidence, definition, cause-effect, comparison, propaganda	Responses require: (1) Analysis of the elements or parts; (2) The analysis of relationships; (3) An analysis of arrangement or organization; and (4) The determination of cause and effect.	1. Watch two commercials on T.V., determine how the words used tried to persuade you to purchase the product. 2. Explain how the data supports your hypothesis and . . .
Critical II Synthesis	This process brings together the various parts to an issue to form a whole, a combining of parts in such a way as to form a pattern not clearly evident before. This category produces divergent and creative thinking.	Responses may include: (1) The production of a unique communication; (2) Production of a plan or proposed set of operations; and (3) The derivation of a set of abstract relations.	1. Use these specifications . . . to design a house that would conserve energy. 2. Write an essay telling why "America is Great."
Evaluation	Evaluation requires, to some extent, all the other categories. It includes making judgments about ideas, solutions, methods, values, etc.	Responses will be based on internal or external standards. Any idea or objection can be evaluated in two steps: (1) Set up standards or values; (2) Determine how closely the idea meets those standards.	1. Is the author qualified to write on the subject? What does the book reveal about the author's personality? 2. We devised standards for a good report. Evaluate today's report using these standards.

*Adapted from Daines, 1982; Sanders, 1973

BEST CO

and their teacher. The following category variables were created and collected by the researcher:

1. Literal questions--are the lower thinking questions. Responses to this type of question require students to recognize or recall facts, details, dates, events, etc. Included in this category are yes/no questions.
2. Critical I questions--are higher level questions. Responses to this type question require students to make inferences, to interpret ideas such as stating the main idea in one's own words, to compare or contrast ideas, to extrapolate ideas from known facts, to make application of knowledge by solving a problem, to determine cause and effect, to show relationships among ideas. This level includes Bloom's comprehension, application and analysis levels.
3. Critical II questions--are the highest level of questions. Responses to this type of question require students to create something new or to make judgments based on criteria. This level includes Bloom's synthesis and evaluation levels.
4. Affective questions--are questions that allow students to examine and express their own interests, attitudes, appreciations, opinions and values in reference to a topic or concept.

Observation Time--the amount of time that the researcher spent taking observational data in the classroom. The observational instrument, TiCOR, has a built-in timer. The observation time was the

recorded time from the first question asked or comment made after the reading of the selection/story to the end of the last question.

Participation--a reference of time in the discussion when the student is speaking. TICOR used the following categories: a) asking questions of teachers or students for points of clarification or information, or as a comprehension probe; b) answering the teacher's question or another student's question; c) reading aloud part of the text to answer a question or verify an answer; d) reading one of the questions posed by someone else; e) whether the teacher or the student was conducting the discussion.

Shared Controlled Discussion Groups--those discussions where the students go through a set procedure asking the questions, analyzing the type of question asked, and where the teacher says nothing besides general directions in the beginning.

Teacher Controlled Discussion Groups--those discussion sessions where the teacher asked the questions and called on the students to respond.

Limitations

The major limitations of this study were:

1. The treatment (i.e., workshops) offered to teachers was an indirect means of affecting students' change in comprehension and participation. The amount of time and type of emphasis that each teacher devoted to the training could not be controlled.

2. The treatment was analyzed as a molar variable. It is unknown which of the new skills of the teachers and students is most responsible for any behavior change seen in the teachers or the students.
3. The maintenance testing may not accurately reflect a true maintenance level since maintenance data were collected only one month after post treatment data.
4. The time of year in which data were collected, especially maintenance observations, may not represent true performance of teachers and students. Maintenance data were collected during the last two weeks of school, with considerable competition for students' time--assemblies, field trips, sport days, etc. The motivation of the teachers and students for academic activities appeared low. Many of the L.D. teachers were so overloaded with referrals and annual reviews that they were primarily engaged in testing at the end of the school year. Many teachers in both groups did not see their students between post and maintenance testing.
5. Actual student gains or benefits in terms of comprehension and participation may not be realized until the student knows how to use these techniques automatically and can call upon them as he/she is asked to read a new selection.
6. The effects of generalization and/or transfer to the regular classroom setting were not assessed.

CHAPTER 2

REVIEW OF LITERATURE

As the research questions posed in Chapter 1 were developed, certain areas of the literature review assumed greater significance. The first area presented in this review is that of the dynamic features of reading comprehension. As the various theories of reading comprehension were reviewed, it was noted that questioning has been related to comprehension by many theorists. As an assessment tool, as a directive focus, and as an extender of information, questioning has been viewed as possessing a powerful potential. This relationship of questioning to reading is the second area of emphasis in this review.

The historical and current role of questioning comprises the third portion of this chapter. The particular question strategies that have been successful are detailed. The final area considered is the use of such techniques to involve learning disabled students as active participants in the reading comprehension process.

Reading Comprehension

What is reading comprehension? Most models of reading comprehension discuss comprehension as an active process, a dialogue between the writer and the reader, with the writer presenting information or story line and the reader with a set of perceptions, experiences and prior knowledge interpreting or deriving meaning or understanding from

the writer's message (Herber, 1978; Pearson and Johnson, 1978; Taba, 1965). Henderson and Green (1969, p. 14) define reading: "Reading is the process of taking meaning to, in order to construct meaning from, language in print." Figure 1 is a presentation of a Piagetian-based model of learning that can be used within each of the developmental stages to gain a better understanding of the concept of reading comprehension and its relationship to the various reading comprehension models.

Ault and Vinsel (1980) refer to Piaget's description of the learning process in which the organism interacts with the environment by taking in various perceptions (e.g., visual and auditory cues) and acting upon those stimuli which regulate behaviors or intellectual coping. Organization, in their view, refers to thoughts becoming clustered into a system of related behaviors. Adaptation is the other invariant function that occurs. It is composed of two components: accommodation and assimilation. These always occur together. Assimilation can be thought of as incorporating new pieces of information into the already existing mental structures. Accommodation, on the other hand, refers to the alteration of existing structures by contact with novel information. Actually these two components may be viewed as opposing forces: assimilation tries to maintain the current structure and force change upon the external (new information) force; accommodation maintains the external situation and forces change upon the structure. Piaget has discussed structure in reference to the "organizational properties of intelligence" which transcend specific contents (Flavell, 1969, p. 17). Comprehension as an active component of the reading

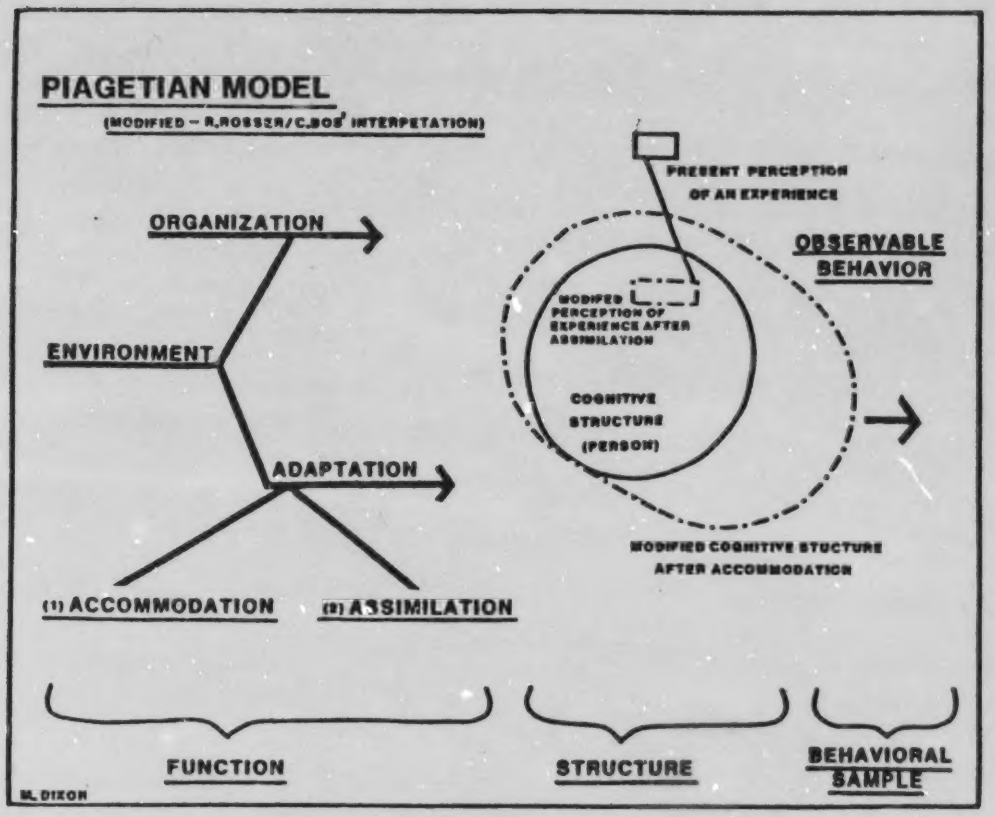


Figure 1. Piaget's Learning Process Model

BEST COPY AVAILABLE

process can be connected with the Piagetian model as represented in Figure 1, as is discussed in the following section.

Pearson and Johnson (1978) define comprehension as building a bridge between the new and the known or as an understanding of what is new in the context of what is already known. One of the components of comprehension is that it is active. Comprehension involves a great deal of inference making, where interpretations are made according to the reader's own perceptions of what the writer is trying to convey. Because of the background and experience the organism has had with the environment, that organism perceives incoming information in a certain way. The process of assimilation tries to change the information to fit the already existing structure. The process of accommodation tries to take in the new information as presented and change the existing structure. The resulting structure represents the mental process or "bridge" that occurs between the new and the known information.

Pearson and Johnson have presented a taxonomy of questions which are useful in discussing the relationship between information presented in a text and the information that has to come from a reader's store of prior knowledge. This taxonomy includes: "text explicit" in which the answers are on the page (factual recall); "text implicit" in which the answers are on the page but are not so obvious; and "script implicit" (experience) in which the answers are not stated but from previous knowledge or experience the reader can make some experiential guesses.

Herber (1978) has also described comprehension as an active thinking process. Smith and Dechant (in Herber, 1978, p. 10) state,

"For learning to become the full property of the learner, he must use them. So long as his knowledge is a passive thing, it is immature and impermanent. Its maturation depends on its active use in new situations." Herber feels this new information is applied to previous ideas and experiences to determine if there is corroboration or contradiction. Again the process of accommodation or assimilation can be observed.

Herber indicates that the components of comprehension are on three levels: decoding symbols (what the author said); interpreting meaning of the symbols (what the author meant by what was said); and applying ideas derived from symbols to new relationships beyond what was written.

Daines (1982) states that reading is a process that goes on internally in the mental structure of the organism, as Piaget has suggested. Meaning does not exist in symbols themselves but rather it exists in the minds of the writer and reader and in the meaning they together attribute to such symbols. Background experience is an essential factor in enabling a student to explore and interact with the environment and to establish a sense of predictability in dealing with the world. The knowledge and experience that a reader brings to what is read will determine in part how well accurate predictions can be made and the material comprehended.

N. B. Smith (1963) explains the word comprehension as a blanket term that covers a whole area of thought setting processes in reading. The emphasis is upon thinking skills in reading. Thinking skills embrace evaluating, judging, imagining, reasoning and problem solving. She categorizes comprehension in terms of thinking demands. Literal

comprehension is a direct idea stated in the text. Interpretation requires skills in supplying or anticipating meanings not stated directly. Critical reading is any reading in which thinking is done, e.g., personal judgment, evaluation on the quality or value of something. In her more recent work, Smith added an additional comprehension category: the creative level. As taxonomies are examined, the way Smith characterizes this level compares to the synthesis description in other taxonomies (Daines, 1983).

F. Smith (1978) describes comprehension as the extraction of meaning from text, or as the reduction of uncertainty. Components of comprehension as viewed by Smith include words that are part of surface structure or the physical representation whether written or spoken. Meaning is part of the deep structure at the semantic or cognitive level.

> The potential informativeness of a sentence lies in the extent to which it will reduce uncertainty in the listener, while the degree to which the receiver comprehends a sentence lies in the number of alternatives that are eliminated. Such a theory of meaning implies that one cannot discuss the "meaning" of a sentence as such, but only its meaning to a particular listener (Smith, 1978, p. 36).

According to Smith, every aspect of reading can be seen as a process of categorization. As he discusses learning and knowledge, he describes three aspects of learning:

1. Establishment of new categories
2. Development of relations among categories
3. Refinement of rules for the allocation of events to categories.

This perception of the importance of the process of categorization to reading is in part tied to the Piagetian model and the give and take of assimilation and accommodation. The expanding or broadening of categories represents a change in the structure. This change links the new information with the known information equaling a modification of structure and future perceptions.

Questioning in Relation to Reading

What is the relationship of questioning to reading comprehension? As each of the comprehension definitions and components was reviewed, a link to the Piagetian learning model emerged. Many of the definitions in the various reading models contained the term critical thinking as it suggested reading as an active thinking process. The Piagetian model points to continual interaction between the organism and the environment. Critical thinking as a part of the process of comprehension requires the active modification of structure described by Piaget.

Educators have claimed that the major goal of education should be to teach children how to think rather than what to think. There is little evidence, however, that direct instruction in the thinking process takes place in schools (Raths et al., 1967). Because educators believe that thinking is important in learning and there is an inherent relationship between thinking and learning (Guilford, 1956), effective teachers feel a responsibility to contribute to the cognitive development of their students. One of the most complex of cognitive activities

is reading. Through the reading process, teachers have sought to develop thinking skills.

In order to promote the development of thinking skills in their students, teachers need to be aware of the levels of cognitive thinking. With this awareness comes the need for the development of activities that will initiate the highest, most challenging cognitive thinking. One of the most frequently used techniques in the classroom is questioning (Guszak, 1972). The question serves a number of purposes. The question can assess what background information the reader has brought to the reading selection. The question can direct the reader to "think about" the most salient features of the story in general or some specific feature of the story. The question can define the relationship the author wishes to bring to the reader's attention. Questions and question-asking seem to stimulate classmates to meaningful interaction. The question can be used to stimulate class discussion. Some advantages of such a discussion group are listed by Carin and Sund (1971):

1. Tends to produce more sustained variety and enriched responses both from individuals and from a greater variety of children;
2. Stimulates volunteering by more students;
3. Contributes to more group cooperation than a written exercise or one-on-one questioning;
4. Approaches a more realistic social situation;
5. Minimizes the tendency towards teacher-dominated lessons;
6. Places the burden for active learning upon the student rather than upon the teachers;
7. Increases flow of ideas and avoids fragmenting discussions.

Schwartz and Sheff (1975) indicate an additional benefit of questioning and group or class discussion--a chance for each child to brainstorm ideas. Hunkins (1976, p. 4) further advises the use of the questions: "Questions serve to focus student functioning and to provide a means for determining relevant from irrelevant information and for pointing up major relationships among information as well as creating new insights and assessing the results of inquiry."

Schwartz and Sheff (1975, p. 150) state that comprehension is a "thinking and reasoning process where multiple skills are employed in concert." The questioning strategy in partnership with other comprehension techniques seeks to develop these thinking and reasoning skills.

The Role of Question Strategies

What has been the role of questioning in the classroom, and how have questions been used?

Researchers are not in agreement about the nature of successive levels of difficulty of human thought (Bloom, 1956; Piaget in Sund, 1976; Smith, 1963; Taba, 1965), but many have sought to define the thinking process with constructs such as Bloom's (1956) taxonomy. Bloom presented six levels of thinking as comprising the cognitive domain: knowledge, comprehension, application, analysis, synthesis and evaluation. Sanders (1966) has sought to help teachers ascertain the level of questions used in their own classroom. Daines (1982) has succinctly noted appropriate responses made at each level (see Table 1, page 7).

"Educators generally agree that teachers should emphasize the development of students' skill in critical thinking rather than in

learning and recalling facts (Aschner, 1961; Carner, 1963; Hunkins, 1966). Yet research spanning more than a half century indicates that teachers' questions have emphasized facts" (Gall, 1970, p. 712).

The many studies that have been conducted on teachers' questioning practices have fairly consistent findings. These studies point out that most questions asked (62-79%) are on the literal level or the lowest level of cognitive thinking (Guszak, 1972; Lucking, 1975). Guszak (1972) reported a study in which he found that children were best at answering the kinds of questions that teachers asked most often. Teachers tended to ask direct "literal" comprehension questions about four times as often as inferential or interpretive questions.

Hansen and Pearson (1980) conducted a study concerning the effects of inference training and practice on children's comprehension. It was concluded that instruction and practice had direct positive consequences on children's reading comprehension with this second grade group of children.

Few researchers have explored the relationship between teachers' questions and student outcomes. Hunkins' (1966, 1968) research was designed to determine whether the type of question bears any relationship to student achievement. Two groups of sixth-grade students worked daily for a month on sets of questions which were based on a social studies text. In one group the questions stressed knowledge or facts and in the other group, the questions stressed analysis and evaluation. Question types were defined in terms of Bloom's taxonomy. Hunkins found that the analysis-evaluation group earned significantly higher

scores on a specially constructed post-training test than did students who answered questions that stressed knowledge.

Gallagher (1965) provided some evidence to support the hypothesis that the pupil's expressive thought level is dependent upon the teacher's level of questioning. Cole and Williams (1973) provide empirical support for the concept that the characteristics of pupil responses are significantly related to the level of teacher questions.

Lucking (1975) reported that hierarchically ordered questions lead to significantly more interpretational responses. This study also looked at students and grouped them in high and low reading ability groups as it examined favorable or unfavorable attitudes towards reading. At the end of the study, it was concluded that there was a relationship between higher order questions being asked and a more positive attitude toward reading regardless of the students' beginning attitudes or reading level.

Enokson (1973) used both a simplified taxonomy based on Bloom's taxonomy and on Guilford's Model of Intellect (questions built around the concept of convergent and divergent thinking) as he looked at response levels. Enokson found differences in response levels and concluded: "It seems logical, therefore, that a working knowledge of the simplified teacher question classification model would be a first step in training teachers to question their students more effectively" (Enokson, 1973, p. 29).

With these findings, it can be concluded that the role of questioning is a significant one in the classroom. Traditionally,

however, as noted in the beginning of this section, most questions asked in the classroom require the lowest level of thinking in response.

These results and others (Dunkin and Biddle, 1974; Ryan, 1973) have demonstrated a need for teacher instruction in the use of higher level questions.

Successful Questioning Strategies

What particular strategies have been successful? The placement of the questions, the types of questions asked and the generation of questions by students have been among the most successful of the questioning strategies.

Placement of the Questions

Perhaps the most researched area concerning questioning strategies has been where to place the questions (prior to reading, in the middle, or at the end of the text). Placement of the questions is being discussed as a strategy for learning since it meets the requirement in the Alley and Deshler (1979, p. 13) definition of learning strategies: "Techniques that will facilitate the acquisition, manipulation, integration, storage and retrieval of information across situations and settings." As this definition is examined, it is apparent that the placement of the questions at various parts of the story qualifies as a strategy. It seems to enhance specific memory and quality of understanding.

A number of studies have found that questioning students has a facilitative effect on recall. Position and type of question are involved in this effect.

> Shavelson, Berliner, Ravitch, and Loeding (1974), investigating the type and positioning of questions for a prose selection, found that those students with low vocabulary scores would score significantly better when assigned to textual material that had higher-order questions (those requiring deeper processing, such as comprehension, application, or analysis) positioned after the passage. Consequently, it was found that the kinds of questions posed had a direct effect upon the responses elicited. LaPorte and Voss (1975) have indicated that the retention of prose over a one-week period is enhanced by the presentation of completion-type questions and feedback immediately following the presentation of information to be learned. In contrast, Rickards (1976) found that conceptual prequestions for prose material provided the best method for facilitating delayed recall of events and the organization of information to be maintained within the structure of memory (Reid and Hresko, 1981, p. 67).

Types of Questions

Reid and Hresko (1981) point out that the issue of placement might also be associated with the type of question asked. Schallert's (1976) study suggested that subjects who had to deal with prose passages on a semantic level had greater retention of the passage than those who dealt with the passage on a non-semantic level. The theory on which this study was based is from Lockhart and Craik's (1972) model. Lockhart and Craik's original conception predicts a direct relationship between depth of processing and the strength of the memory trace. Here, depth of processing refers to a hierarchy of stages through which incoming stimuli are processed, where preliminary stages involve the analysis of physical features and later stages are concerned with the extraction of meaning.

Watts and Anderson's (1971) study looked at the effect of three types of inserted questions on reading comprehension. Students who answered inserted application questions during reading demonstrated a

"striking superiority on both the repeated and alternate application questions" (Watts and Anderson, 1971, p. 391). The authors believed that answering application questions facilitated later performance by encouraging students to process the content of the instruction more thoroughly, in fact to transform it, in the effort to apply it with a new situation.

Because the issue of type of question along with the issue of position was rarely divided, conflicting results concerning the effectiveness of the position of the question are numerous. Reid and Hresko (1981) suggest using a variety of questions positioned in a variety of places in the text. The fact remains that this type of placement seems to help students focus on the material read and become more involved in the comprehension process.

Student Generated Questions

Who should be asking the questions? Teachers have used questions to focus thinking as well as to check general comprehension. Should questioning be the teachers' tool? "A growing body of research exists which indicates that students attain higher levels of thinking when encouraged to develop skill in asking their own questions and when provided with more opportunities for dialogue with classmates about the questions posed and conclusions derived from information" (Carin and Sund, 1971, p. 39).

Anderson's (1978) review of the research on study techniques indicates that a combination of reading and generating questions from the material is an effective technique for ensuring better comprehension.

Models of studying which include prereading, reading, and postreading provide one explanation for this effectiveness. Asking questions before one reads helps to set the purpose related to the study session. During reading, the reader can continually check predictions and know what should be asked next. After reading, this strategy can help break the material into smaller units and provide a self-check on comprehension of the material. Anderson supports the thesis that active involvement in the learning process is vital for education to be meaningful.

Singer (1978) describes Ruddell's adaptation of Taba's questioning strategies and proposes a strategy for teaching students to ask their own questions. Donlan and Singer (1979) report on their study that measured three methods of preposed questions aimed at improving comprehension, teacher prepared questions, student prepared preposed questions and schema self-preposed questions (embodying teacher-specified limitations within which students prepared questions). It was found that when teachers preposed the questions, comprehension tended to be narrowed because students focused on passages related to those questions. When students preposed the questions, their questions were sometimes digressive, irrelevant and encouraged attention only to question-related passages. Best results were found with the schema self-preposed techniques in which students generated preposed, story specific questions based on a schema of content-general questions. These types of questions tended to focus the reader's attention on passages answering questions that were pertinent and relevant to those asked on a content-valid comprehension test. "Students who have the skill and commitment to question themselves, their leaders, and the

basic assumptions of social and political systems are more likely, as adults, to be able to find viable solutions to the world's pressing problems since the questions we ask profoundly influence our conclusions and actions" (Hunkins, 1976, p. xiii).

Rickards (1976, p. 621) stated that, "Some researchers (Ausubel and Fitzgerald, 1982; Campbell and Borich, 1973; Sanders, 1973; Shavelson et al., 1974) have found that those who score low on tests of verbal ability (presumably poor readers of some kind) benefit disproportionately more from advance organizers and high level questions than those who score high on such tests."

Andre and Anderson (1978) found that comprehension improved after training students to ask questions, and they also discovered that student generation of questions during study is more effective for lower than higher verbal ability students. Of course, one major benefit in having students ask their own questions is the involvement in the subject matter or story that must come when making up questions.

The quality of student questions becomes an issue. Alley and Deshler (1979) suggest that the students must be able to identify the type of questions they are asking so that they can evaluate if those questions are significant and at a higher cognitive level. Hunkins (1976) not only suggests that the students be able to identify and label the type of questions asked, but they be able to use the full Bloom's taxonomy with all its levels when labeling.

Raphael and Pearson (1982) state that giving metacognitive training in question answering was an important component in observing higher performance on text based questions.

Mills et al. (1980) suggest that the way to teach students to ask higher level questions is to train teachers to develop a questioning frame of reference with their students. They suggest further research that might involve training students in the use of the same cognitive classification system as is used by the teacher. This teacher/training, student/training approach offers a two-fold advantage: (a) mutual reinforcement for teachers and students to engage in higher level discussions, (b) reduction of the length of time it takes students to catch on to the higher cognitive discussion situation.

Teaching students to ask their own questions encourages involvement in the learning process. Teaching them to evaluate and assess the level of the questions they ask develops a strategy that aids them beyond the classroom.

Questioning and Related Strategies with Learning Disabled Students

Can questioning strategies involve the learning disabled "inactive" student as an active participant in the reading comprehension process?

Wong's (1979b) study with learning disabled students in reading comprehension has indicated that questioning strategies are effective. Her research with fifth grade L.D. students investigated whether or not the use of questions would increase learning disabled children's comprehension and retention of main ideas in a given story. It appears that the questions preceding respective target stories directed the learning disabled children to search for important information as they read. This seemed to substantiate the prediction that questioning

could and did lead L.D. students to become actively involved in their own learning.

In Torgesen's (1977, 1980) research on memory, it has been concluded that L.D. students can perform more effectively when prompted by a questioning activity.

In terms of reading and questioning, few studies have been completed with L.D. students. Schwartz and Sheff (1975) point out the characteristics of passive readers. Passive readers, like "inactive" L.D. students, for many reasons have grown to expect little meaning from what they read.

1. They do not apply their experiential background to assimilate new learning.
2. They have approached reading quite unaware of why they are having difficulty.

The learning strategy approach which encompasses questioning strategies is the teaching of specific techniques or rules that can help students cope with the demands of the classroom. A learning strategies model of instruction for learning disabled adolescents is designed to teach the students how to learn rather than to teach specific content. The adage, "Give me a fish, and I can eat for a day. Teach me to fish and I can eat for a lifetime" (Alley and Deshler, 1979, p. 13) applies to the learning strategy model.

The "how to learn" focus of learning strategies parallels the recent metacognition literature (Brown and Palinscar, 1982). Metacognition has been referred to in terms of two main definitions: (1)

knowledge about cognition; (2) regulation of cognition. Knowledge about cognition involves conscious access to one's own cognitive operations and reflection about those of others. Regulation of cognition involves preplanning and control, monitoring, testing, revising and checking outcomes. Alley and Deshler (1979) have indicated that L.D. students can be taught questioning strategies although unless reminded or cued they might not automatically use the appropriate strategy.

Bos and Filip's (1982) study indicated that learning disabled students were not deficient in comprehension monitoring but failed to spontaneously adopt task-appropriate strategies. It further indicated that learning disabled students can be activated to produce these task-appropriate strategies with relatively minimal training or cueing. The students in those groups who were being cued to use comprehension monitoring were able to detect text inconsistency and text confusion.

Recent research at the University of Kansas Research Institute with learning disabled adolescents has emphasized questioning and reading comprehension. Hori's (1977) research demonstrated that adolescent L.D. students could use a questioning strategy (ReQuest reading procedure developed by A. Manzo, 1969) to enhance reading comprehension as well as to increase the quality of their questions.

Multipass (Schumaker et al., 1982) is a learning strategy used to improve comprehension and designed to enable students to gain information from textbooks. Questioning as a process is a major component. Multipass is an adaptation of Robinson's (1946) SQ3R method: "(a) a quick survey (S) of the chapter (Pass 1); (b) a second pass through the chapter where the student turns subtitles into questions (Q),

reads (R1) to locate the answer to the question, recites (R2), and makes notes of the answer (Pass II); and (c) a final review (R3) of the material (Pass III)" (Schumaker et al., 1982, pp. 295-296). Using the steps of acquisition and carefully teaching the steps of Multipass to eight secondary students, it was concluded that learning disabled students can be taught to use a complex learning strategy. Their grades in tests covering textbook material improved markedly.

Torgesen (1977) has effectively summarized the current data on the "inactive learner" in saying that the learning disabled students (1) lack the ability to know how to recognize their own abilities; (2) lack the ability to recognize the demands of the task; (3) lack the knowledge and confidence that they need to plan and to accomplish the task, i.e., lack of goal directedness; and (4) lack the realization that it is necessary to seek strategies to make tasks easier.

It is felt that the research shows that questioning strategies can and do relate to the reading comprehension process. However, this relationship has not been demonstrated with the learning disabled population. Very few studies have been conducted with the elementary learning disabled students using the questioning strategy. A substantial amount of research needs to be completed before generalizations can be made concerning the efficacy of questioning strategies for learning disabled students.

CHAPTER 3

DESIGN OF THE STUDY

The major purpose of this study was to determine the effects of question strategy instruction on the instructional methods utilized by L.D. resource teachers in teaching L.D. students. Student participation and reading comprehension were the two variables examined in this two group, independent sample design with repeated measures. This research had a dual focus: a teacher-training component referred to as Part I and a student participation and comprehension component referred to as Part II.

The basic objective for the teacher training component was to investigate whether teachers could raise their own level of questioning during discussion of assigned reading material from a literal or factual level to a higher cognitive level of questioning. The basic purpose of the student component was to investigate the students' reading comprehension of narrative stories as well as to observe the students' ability to participate in the discussion following the reading of a narrative story, to label questions that accompanied the story as either fact, inference or opinion questions, and finally, to generate their own questions based on specific criteria.

This chapter presents a description of the pilot study and a discussion of the subjects, materials, procedures, scoring systems, and data analysis used in the main study.

Pilot Study

The pilot study was conducted primarily to examine the reliability of a data collecting instrument, TICOR (see main study for detailed description), and the appropriateness of the various stories and accompanying comprehension questions for the three phases of the main study.

Subjects

Five randomly selected L.D. resource teachers in a district other than the district used for the main study were utilized in the pilot study. The students were 18 fifth and sixth graders assigned to these teachers' resource rooms. These students had been identified as learning disabled with reading comprehension as a primary area of weakness noted on their Individual Education Programs.

Procedure

The pilot study lasted for five weeks. All teachers and students were assessed during the first, second, fourth and fifth weeks. Inservice training of the teachers was conducted during the third week. Each assessment week the researcher went into each classroom for three days and recorded the interaction between the teacher and students during the discussion periods that followed the students' reading of a narrative story. Twenty-three different stories were used. All stories were on a third grade level of reading, within the range of reading ability of the students. Eight stories of 550-650 words were used for the written reading comprehension assessment. The fourth day

of each week the students were asked to take a written reading comprehension test following the reading of a story. The first week the students were asked to read two stories. They read one of the stories, answered questions about it, and labeled the types of questions asked. The students then read a second story and were asked to make up their own questions. After the first week of testing, it was evident that the students were unable to read two stories and respond to them in a 30 to 40 minute session. In subsequent weeks, they read one story, generated their own questions concerning the story and then labelled and answered the questions of the researcher about the story. Three types of questions were targeted: factual, inferential, and opinion. In addition, the students evaluated the story for interest level.

All teachers attended a one day inservice during the third week in which they were taught levels of questions, ways to involve students in analyzing questions and teaching students to become the discussion leaders. No assessment was conducted during this third week.

Based on the written reading comprehension test, taken on the fourth day of weeks one, two, four and five, three types of scores were obtained: number of questions generated, number of questions answered correctly, and number of questions labelled accurately as to type. The results of the pilot study showed significant differences at the .05 level between pre- and post-training in the students' ability to answer comprehension questions. Informal analysis indicated that the increase in students' ability to generate questions was primarily the result of improvement in asking factual questions.

Results and Implications

The implications of the pilot study assisted in determining the following procedural decisions implemented in the main study:

1. Of the eight stories used in assessing reading comprehension, two were eliminated, one due to the third grade ceiling effect noted for one child and one due to ambiguous questions. These two stories were not used in the main study.
2. It was determined that a five day measurement period was more appropriate than four days. An additional day of testing was added to the procedures of the main study.
3. Nine of 15 stories were determined to be equal in reading level, of similar construction and student interest, and produced similar ease in discussion outcomes as measured by TICOR. Six of the eight testing stories proved to be similar in reading level, length and construction.
4. New observational variables were added to the "program" that TICOR recorded. One main level, affective, was added in the types of questions asked. Questions like "How did it make you feel when the horses were mistreated?" didn't seem to fit into any of the existing categories. Also the modifier key "student reads the text to answer a question" was added.
5. One particular strategy taught during the inservice, student involvement, excited the teachers to such a point that four of the five teachers used either shared control or student control of the discussion session. In other words, students were either leading or sharing the leadership of the discussion

groups. This resulted in a dramatic drop in the number of questions asked by the teacher because the students were asking the questions and directing the discussion. For this reason, a stipulation in the main study (after treatment) was that "at least one of the three days of discussion must be teacher conducted."

Main Study

The results and implications of the pilot study helped to determine changes in methodology and procedure for this research. This section discusses the subjects, materials and instrumentation, procedures, outline of workshops, scoring of data, and analysis of data.

Subjects

Part I Teacher Training Component. Twenty randomly selected resource teachers employed by a large urban southwestern school district were selected to participate in this study. The school district serves the majority of students in the city. This district serves over 8,000 special education students. Approximately 1,000 students are in resource classes in elementary schools and are served by 81 resource teachers.

From the pool of 81 elementary resource teachers in the school district, 20 teachers were randomly selected. Those teachers selected were contacted to see if they had at least three learning disabled students who were in the fifth or sixth grades and who met the specific student criteria.

Each teacher was contacted by the researcher and asked if he/she would be willing to participate in a study dealing with reading comprehension. The teachers were told of the five weekend workshops to be held as part of the study. If they were unable to make this time commitment (experimental group stipulation), the alternative (control group stipulation) was presented. If any of the teachers did not wish to participate under either condition, the researcher randomly selected another teacher from the original teacher group until ten teachers were identified for each group.

In one building, when it was determined that the resource teacher did not have at least three fifth or sixth grade students having reading comprehension difficulties, the L.D. self-contained teacher was introduced to the researcher because of the high level of interest of the principal. This one self-contained teacher, who mainstreamed most of her students during the day except for reading, had more than three of her students who met the criteria. This teacher became one of the ten experimental teachers selected.

The researcher contacted 31 teachers before finding ten teachers for each group. The experimental group A_1 was told of the three day observation procedure and the specific dates of the five weekend workshops. (Objectives and content will be discussed in a following subsection.) Those in Group A_1 received three hours of graduate credit in Special Education from the University of Arizona for the workshops and related activities. The control group A_2 was told of the observation procedure and the one-day inservice that would be provided after the completion of data collection.

Table 2 indicates the characteristics of both the experimental A_1 and control A_2 groups. This information was gathered at the conclusion of the data collection by means of a questionnaire (Appendix A).

Table 2. Teacher Characteristics of Experimental and Control Groups

Teacher Characteristics	Groups A_1 Experimental N=10	A_2 Control N=10
Education		
L.D. certified	10	10
Master's degree	10	8
Master's degree plus 11 or more hours	7	4
Second master's	1	3
Educational specialist	0	1
Teacher Experiences		
Total teaching years--range	1-26	1-35
--mean	17	15
Years in L.D. resource--mean	8.2	6.8
Chronological age--range	24-60	26-60
--mean	44	42
Average salary*	over $24,000	over $24,000
Reading courses beyond B.A.--mean	4.1	4.0

*Questionnaire--ceiling effect on salary $26,000 or more

These characteristics listed indicate that the teachers in both groups were similar. Because of the time commitment required of the experimental group in taking the course, it was impossible to randomly assign teachers to a condition. Although it may appear that those in the experimental group were more motivated towards improving skills than those in the control group, the numbers of master's degrees and additional graduate hours in both groups indicate that the teachers in both groups were used to taking courses in an effort to improve their teaching skills. Four of the control group teachers have young children and could not leave them on weekends. Four had prior weekend commitments and two expressed a need to relax on weekends. All of the control group, however, expressed a desire to participate in the study because all handouts, materials and reading comprehension techniques would be shared in a one-day inservice at the end of the study.

Part II Student Component. The student subjects were 68 learning disabled fifth and sixth grade students enrolled in resource rooms in the same urban southwest school district. The criteria used to select the student population were as follows:

1. Enrollment as a learning disabled student of randomly selected L.D. resource teachers who participated in the study. These students had been designated as learning disabled students based on the criteria included in Public Law 94-142, the Education for All Handicapped Children Act, and the school district's criteria. Appendix B is a summary of federal, state and district criteria.

2. Enrollment as a fifth or sixth grader.
3. Identification of reading difficulties as a significant problem as stated by the teacher on the IEP.
4. Reading achievement on at least a third grade level as measured by a standardized individually administered reading test.

During the study, seven of the 68 students who met the previously described selection criteria moved away from Tucson and one was removed from the L.D. resource placement. At the end of the study, 32 of the 60 remaining students were enrolled in resource rooms and their teachers were involved in the training workshop. Twenty-eight of the students were in classes where their teachers did not participate in any training until after the final maintenance measure.

Student characteristics are shown in Table 3. This table indicates: the number, chronological age, sex, grade, IQ, reading grade equivalent and bilingual identification in both the experimental and control groups.

Materials and Instrumentation

In the following section the materials and instrumentation used will be discussed, including narrative stories for discussion or for student testing, TICOR, tape recorder, and written comprehension tests.

Narrative Stories. Because discussion group dynamics are so tied to the specific story/text being discussed, stories were provided by the researcher. The pilot study (see page 32) looked at a total of 23 stories. All stories selected were from World Book: Reading

Table 3. Student Characteristics of Experimental and Control Groups

Student Characteristics	Groups Experimental N=32	Control N=28
Age--range	9-10--12-11	10-3--12-11
--mean	11-5	11-9
Sex		
Male	17	21
Female	15	7
Grade		
Fifth	8	10
Sixth	24	18
IQ--range	70-120	74-118
--mean	91.6	93.4
Reading Grade Equivalent Range	2.9-7.2	2.9-6.0
Bilingual (Spanish speaking English proficient)	12	9

Development Program Level 3 Books 1-4 (1981). All of the stories have been rated at 3.0-3.1 by both the Fry (1968) and Spache (1953) readability formulas and all were narrative in structure. Eight stories, because of similar length of 550-650 words, were selected as the narrative passages for student testing. Comprehension questions were developed. Two stories were eliminated from use in the main study because in the pilot study, students consistently got higher scores across trials on one story, and on another story, some of the questions seemed ambiguous or unclear. In the pilot study 15 stories were originally

looked at. Teachers daily assessed the stories for vocabulary difficulty, conceptual difficulty, interest and readability, including word recognition. They also rated ease of asking questions about the story and ease of conducting discussion groups. Finally, in the pilot study, teachers were asked to star the stories most interesting to the students, ranking the stories from favorite to least favorite. The pilot study teachers sought the opinion of the students. According to these criteria, none of the 15 narrative stories were finally selected as the discussion stories for use in the main study.

TICOR. A Time Interval Categorical Observation Recorder (TICOR) was used to collect observational classroom data. TICOR is a microcomputer that is comparatively small in size (contained in a lightweight briefcase), has a silent typewriter-like keyboard, and contains an internal power supply which makes it completely portable. Table 4 shows a sample TICOR printout. Appendix C is an abstract which describes TICOR.

Teacher-student interaction during discussion groups following the reading of the stories was recorded with TICOR and subsequently fed into the VAX 11/720 computer. For the purposes of this study, the TICOR research looked at a type of ethnographic data.

In the Part I Teacher Training Component, the following categories and subcategories were established by the researcher to describe teacher-student interaction using TICOR:

1. Teachers' levels of questions: Literal, Critical I, Critical II, Affective.

Table 4. Sample of TICOR Printout

Teacher's Response Profile

```
                REPORT:JUL 7                              NUMBER:  2

DESCRIP.:TEACHER QUESTIONS          INTRA-GROUP:  6   FILE:BIG2.TIC
DATE:0411          TCHR:0010          SINT:0010          PPNN:2005          IDNN: 129
TOTAL SECONDS TIME:  1000.3      MINUTES OF OBSERVATION:  27.77

                          NUM    RESP STAND    %                      STAND    %      %
EXPLANATION               RESP   /MIN DEV      RESP  DURATION  MEAN   DEV      DUR    T.DUR
TCHR -- ASK LIT. QUEST     20.   0.72 1.07    14.60     41.9   2.10   0.97     2.51    6.90
TCHR -- ASK CNT. I QST     12.   0.43 0.73     8.76     36.0   3.07   1.37     2.21    6.06
TCHR -- ASK CNT. II QST    37.   1.33 1.28    27.01     84.4   2.28   1.05     5.07   13.90
TCHR -- ASK AFFECT QUEST
TCHR -- COMMENTS RELATED   68.   2.45 1.25    49.64    484.3   6.53   8.43    26.66   73.15
TOTAL     RESPONSES:      137.   4.93 1.65   100.00    607.8   6.43   6.35    36.65  100.00
```

Student #3's Interaction with Teacher

```
                REPORT:JUL 7                              NUMBER:  2

DESCRIP.:STUDENT THREE PARTICIPAT   INTRA-GROUP:  3   FILE:BIG2.TIC
DATE:0411          TCHR:0010          SINT:0010          PPNN:2005          IDNN: 129
TOTAL SECONDS TIME:  1000.3      MINUTES OF OBSERVATION:  27.77

                          NUM    RESP STAND    %                      STAND    %      %
EXPLANATION               RESP   /MIN DEV      RESP  DURATION  MEAN   DEV      DUR    T.DUR
STD3 -- UNDEFINED          2.    0.07 0.26     5.13     18.6   9.30   5.20     1.12   11.58
STD3 -- LITERAL ANSWER     6.    0.22 0.49    15.38     15.0   2.50   1.96     0.90    9.34
STD3 -- CRITICAL 1 ANS.    2.    0.07 0.26     5.13      4.2   2.10   1.00     0.25    2.62
STD3 -- CRITICAL 2 ANS.   15.    0.54 0.78    38.46     55.7   3.71   3.07     3.34   34.68
STD3 -- AFFECTIVE ANS.
STD3 -- ANSWERS W/READ     3.    0.11 0.31     7.69     24.3   8.10   3.84     1.46   15.13
STD3 -- STUDENT READS Q.
STD3 -- COMMENTS RELAT.   10.    0.36 0.67    25.64     41.5   4.15   3.13     2.49   25.84
STD3 -- WHAT KIND OF Q.
STD3 -- WHAT PROOF Q.
STD3 -- AGREE OR DISA. Q
STD3 -- STUDENT ASKS       1.    0.04 0.19     2.56      1.3   1.30   0.00     0.00    0.01
STD3 -- ASK LIT QUESTION
STD3 -- ASK CRI I QUEST
STD3 -- ASK CRI II QUEST
STD3 -- ASK AFFECTIVE W.
STD3 -- EVAL COMMENTS RE
TOTAL     RESPONSES:      39.    1.40 1.20   100.00    160.6   4.12   3.58     9.64  100.00
```

BEST COPY AVAILABLE

2. Teacher comments: related and unrelated (unrelated had to do with mechanics of classroom or discipline of students).

Tape Recorder. In addition to TICOR, a tape recorder with a sensitive built-in microphone was used to tape the first three days of each measurement period.

Written Comprehension Tests. The measurement instrument for the student component was written comprehension tests designed by the experimenter to assess comprehension of the narrative stories presented. No published comprehension tests were available and sensitive to the specific components being targeted in this study. The test instrument contained two parts and measured three comprehension skills. The test measured:

1. The ability of the student to write short answers to ten comprehension questions about the story. Included in the questions were at least two of each type: fact, inference, and opinion. There were usually more fact questions than any other type. The labels taught to the students were a simplified version of Bloom's taxonomy of questions. The fact questions are at the literal level, the inference questions are at the interpretation, application and analysis level, opinion questions are those questions that require evaluation or synthesis. Appendix D is an example of the questions asked.
2. The ability to identify and label what type of question these ten comprehension questions were.

3. The ability to generate or construct six questions relevant to the story: two factual, two inferential, and two opinion questions. Appendix E is the form that the students used when developing questions.

Procedures

In this section the procedures for each five day measurement period, the training and their related assignments are discussed.

Five Day Measurement Period. All teachers and students were assessed three times during the study: once prior to training (the pretest); at the end of training (the posttest); and one month following the training (the maintenance test). The researcher arranged with the teacher the appropriate time and days to come for data collection. The students observed were the same throughout the study. Each data collection period took five days: three days when the researcher collected data (with TICOR and a tape recorder) during the discussions of the stories and two days when the students read the stories and then took the written comprehension tests. The stories that were used as stimuli for the discussion sessions were given to the teachers at least one week prior to the observation dates. The teachers were instructed to have the students read the story. It was recommended that the students read them silently but the teacher made the decision as to silent or oral reading. If the teacher thought the students would have difficulty reading the story or wanted to read it as a group, she generally had the students read it aloud. Three experimental and six control teachers would orally read the whole story with their group (each

student taking a turn) before the discussion began. It usually took 10 to 15 minutes to read the story.

Following the reading of the story, the teacher was instructed to discuss the story with the students. There were no time limits set. However, the teachers usually used the entire resource session to which the students had been previously assigned. The measurement of time began after the reading of the story had been completed and the first question was asked, and continued until the response of the last question. The experimental group's time measurement varied between 15 and 34 minutes with a mean time of 17 minutes per session. The control group's time measurement varied between 6 and 23 minutes with a mean time of 15 minutes.

Three questions were often asked of the researcher by the teacher concerning the reading of the stories: "Can one do pre-reading or vocabulary development prior to the reading?" The answer given was, "Whatever you usually do with a story is just fine. The data, however, will be measured with the first question after the reading of the story." A second question asked was, "Can we read the story in sections and ask questions following each section?" The response given was, "Measurement will occur with the first question following the reading of the first section." Five experimental teachers and six control teachers would read the stories in sections, asking questions after each section. A third question asked was, "Will you provide questions to ask?" The answer was, "No, just do what you usually do when you plan to discuss a story."

The researcher was scheduled to observe 180 discussion sessions, nine sessions for each teacher. However, because of scheduling problems, 172 sessions were observed. The order for presentation of the nine discussion stories was randomized for each teacher so that each of the 20 teachers presented stories in a different order. Appendix F is a listing of the story order of presentation.

During the fourth and fifth days, the students took the written comprehension tests. Both the experimenter and a trained doctoral student in Special Education administered the tests given the fourth and fifth days. Because of the two testers, a set of instructions was developed. On the fourth day, following a short briefing session on labeling, the students were asked to read the story, answer the comprehension questions and label the type of question asked. The following activities and dialogue occurred on the fourth day during the briefing session on labeling.

With the labeling sheet in front of the student, the researcher explained: "Today, I'm going to read out loud a short story, please follow along as I read it. When I am finished reading it, we will answer some questions together." Appendix G is the sample labeling story.

Researcher reads: "Tom was going to school. He saw the bus coming and ran as fast as he could. But Tom missed the bus! He got on the next one. Then Tom dropped his money. The coins rolled all over. Tom had to pick up his money. At last, he put it all in the fare box. He sat down. He relaxed and looked out the window. Then Tom got a

surprise. He saw his school. Tom had forgotten to get off the bus in time" (Science Research Associates, Inc., 1974).

"Will someone read the first question." Always hands went up and/or someone started reading it. "Did Tom miss the bus?" The students would usually say yes. "Okay, write yes in the square between the first and second question." Researcher then would ask, "How do you know he missed the bus?" Students would usually respond with, "It says it in the story." Researcher: "Yes, look down at the bottom of this page. This question is a fact question because . . . . ." Researcher then read the definition. "Now, on the little line in front of ___1, put a big F because it is a fact question."

"Now would ____ ____ read the second question?" "What tells us that the boy didn't have his mind on what he was doing?" Usually more than one answer would come out. If not the researcher asked, "Are there any other clues that tell us that the boy didn't have his mind on what he was doing?"

"Put in the space between questions 2-3 the part of the answer you think best answers this question. If you need any help with spelling, just ask. Don't worry about spelling, do your best but if you want help, just raise your hand."

"This question calls for an inference (read definition). An inference is . . . . Why is this an inference?" Usually students would say, "Because we got clues all over the story." "Put a great big I in front of #2."

Read question #3. "Based on what you read, what do you think might have happened before Tom went to school?" Typical answers:

"Tom got up late." "He was slow eating his breakfast." His mother was yelling at him because he was poking around." "He forgot to do his homework."

"All of these are possible answers. Who is right?" Students usually say, "We don't know, the story doesn't say." That's right, all of your answers are right because it's what you think that is important. It's your opinion."

"Put in the space after #3 what you think might have happened. This is an opinion question (read definition). Now, put a great big O in the line in front of #3."

Then the reading passage for the day was presented. "Today I want you to read a story to yourself and answer ten questions about the story. I also want you to tell me what kind of question it is, F fact, I inference, or O opinion. If you need help with any of the words, just raise your hand and I will be glad to help you."

Many students, especially in the classes where they had been reading the stories together, asked if they could read together. The researcher would say "no" but offer again to help them with any problem words. They would then answer questions and the researcher would help them with difficult words as they read, and any spelling problems if they asked while they answered the questions.

The fifth day the students were asked to read a different story and then generate their own questions, two fact, two inference, and two opinion. Again on the fifth day prior to reading the story, the same labeling exercise was used as a training session. After the labeling exercise, the researcher said, "Today you get to ask the questions.

Read this story and then think of two fact questions, two inference questions and two opinion questions. You may all keep your labeling exercise. It may help you as you start making up the questions you will ask. Today you don't have to answer these questions." To prevent an order effect or the possibility that one set of questions might have been easier to answer or generate, the stories assigned to each measurement period were done randomly (see Appendix H).

Outline of Teacher Training Workshops. The teachers in Group A_1 (the experimental group) attended five weekend workshops that were held at The University of Arizona, Friday evenings 7-9:30 p.m. and Saturdays 9 a.m. to 4 p.m., for a total of 45 hours. These five workshops were held two weeks apart beginning January 29, 1983 and concluding March 27, 1983. Each weekend a new person presented certain material. A brief description of the presenter, content, activities, assignment, and appendices can be found in Table 5. During this five week period neither group was observed. The control group received no training.

Scoring the Data

The following scoring procedures are discussed under two measurement systems: TICOR and written comprehension tests. Reliability of each instrument will also be discussed.

TICOR. The record from TICOR was processed through a VAX/11/720 computer and the subsequent printout was analyzed. TICOR measured:

Table 5. Description of Workshops

Date/Selected Handouts	Presenter	Content	Activities	Assignment
January 28 January 29 Appendix included 1) Recognizing Questions at Six Cognitive Levels 2) Understanding Levels of Comprehension 3) Explicating Patterns of Organization 4) Levels of Reading Comprehension	Delva Daines Brigham Young University Professor in the Department of Curriculum and Instructional Sciences	Dr. Daines answers the following questions: 1) Why ask questions? 2) Why focus on teachers first? 3) What are the facets of a taxonomy for questioning? 4) What is Bloom's taxonomy?	1) Studying sample questions 2) Devising questions 3) Writing and analyzing questions 4) Teach students to answer questions 5) Preparing questions to use with students	Design two questions at each level of the cognitive hierarchy
February 11 February 12 Appendix included 1) Six-phases Questioning Strategy--A Device for Developing Critical Thinking Skills	Joan Rossi Foster City, California Director of Foster Reading Institute	Philosophy of student becoming the important one in discussion group Presentation of the six-phases of involving student in reading and writing process	1) Demonstrate with children Phase 1 2) Work in teams in decision making concerning various levels of questions	Tape classroom-session, and turn in a tape of the class discussion that reflects the highest phase (of the six-phase technique) the teacher group has reached

BEST COPY AVAILABLE

Table 5, continued

Date/Selected Handouts	Presenter	Content	Activities	Assignment
February 25 February 26	Francis Hunkins University of Washington Professor of Education	Presented ways to change teacher attitude towards student becoming the questioner. Noted ways to make asking questions a pay-off for student. Explained key stages of student involvement.	Used portion of his book teachers adapted method (Bloom taxonomy to fit his method) resulting in the student becoming analyzer of various questions asked	Write two questions at each level
March 11 March 12 1) Definition of Taba's Levels of Questions 2) Taba's Schema for Analysis of Three Cognitive Tasks	John Bradley University of Arizona Professor of Reading (Personal emergency at last moment) Margaret Dixon presented using notes & materials of Dr. Bradley	1) Presented assumptions about asking questions 2) Presented Hilda Taba's levels of cognitive thinking as group developed questions at each level	1) In teams using narrative stories pull apart story 2) Ask Taba level questions at each point 3) Share and react to one another's questions	Story handed out, develop two questions at each level using Taba's level paper, tape classroom session
March 24 March 25 1) Acquisition Steps When Learning a New Strategy 2) Self-Questioning Strategy	Donald Deshler University of Kansas Professor of Special Education	Presented definition of learning disabilities. Listed major findings at Institute of Learning Disabilities at Lawrence Kansas. Major focus was the acquisition and generalization of skills	1) As he presented steps in acquisition various learning strategies were listed 2) Presentation of generalization skills--how to transfer from one setting to another	Fill our workshop evaluation

BEST COPY

1. The level of questions asked by each teacher.
2. The number of responses per minute based on the length of the observation time.
3. The percent of time each student spends in the discussion in relationship to total observation time which is defined as student participation.
4. The percent of the total discussion time spent for each level of question answered.

Written Comprehension Tests. Three types of reading comprehension tests were conducted over the three measurement periods: (1) student short-answer responding to ten comprehension questions; (2) student labeling of ten comprehension questions according to F (fact), I (inference) and O (opinion); and (3) student generating six questions, including two fact, two inference and two opinion.

Comprehension questions--Students answered ten short answer, free response comprehension questions: fact, inference, and opinion. Fact questions were scored as accurate if they matched text appropriate responses given during the pilot study. In addition, novel or unusual responses were judged accurate if they were appropriate and based on the text. For example, responses to the question, "What animal ran up the tree?" such as the dog, the puppy, Sam, the little girl's pet, her canine, the mutt, were all acceptable answers.

Inference questions that had several possible answers were judged as accurate if the answer made sense and was based on the clues found in the story. A list of possible answers was indicated on the

key. Student responses from the pilot study, marked as correct, were the basis of the list. For example, the following responses to the questions, "How do we know this coyote was pretty smart?" were all marked as correct according to these criteria: "She didn't get caught by the ranchers; she would circle around her den looking for enemies or danger before she went out; she played with her pups but didn't let them go too far away from her; when she knew that Gramp and Jenny had seen her, she moved her pups the next day."

Many of the opinion questions had two parts. If a yes/no response was followed by "Why?", the students needed both parts to get full credit. Half credit was given to students who gave responses only to the justification part of the question. No credit was given if the student simply gave a yes/no response.

Answers on all types of questions which were difficult to read or which didn't make sense were marked wrong. Credit was not deducted for incomplete sentences or spelling. Ten points were possible. One point was given for each question on this part of the test.

Labeling the questions--The students could label questions before, after, or as they responded to the short-answer comprehension questions. All answers were marked for accuracy based on a key. In the six stories, three of the 60 questions had two possible answers, both of which were accepted. As the researcher went through the tests, it was noted that more than one answer could be justified. Ten points were possible, one for each correctly labeled question.

Generating questions--In order to receive credit, all questions had to be in question form, categorized appropriately, and readable.

Half credit was occationally given when some words of the question were absent, but the meaning was evident. Six points were possible, one for each question that was asked by the student. Each of the questions had to be in the correct category.

Interobserver Reliability. The interaction between the students and their teachers was recorded by the researcher on TICOR as well as on a regular tape recorder. The tape recorder made it possible to measure interobserver agreement between the researcher and a second observer. Kazdin (1982) lists three main reasons to assess agreement:

1. Assessment is useful only to the extent that it can be achieved with some consistency.
2. Interobserver/interrater assessment seeks to minimize or circumvent the biases that any individual observer might have.
3. Assessment agreement helps to reflect whether target behaviors are well defined.

He further noted, "Hence interobserver agreement is not a measure of accuracy. The general assumption is that if observers record the same behaviors their data probably reflects what the client is doing" (Kazdin, 1982, p. 51).

A doctoral student in Special Education was trained as a second observer to analyze levels of questions and to code data. Training took place over the four months prior to the main study.

1. The trainee attended the one day inservice workshop held for the teachers in the pilot study.

2. Several tapes were transcribed from the pilot study. Both the trainee and the researcher marked each statement at this point and compared answers and discussed differences.
3. Coding on TICOR of the discussions occurred many times in the pilot study.
4. The trainee attended several of the workshops during the main study. Each workshop further defined specific components of each level of questioning.

TICOR Reliability. Because there were judgment calls in determining the level of question asked, this study was designed to have a second rater to assure reliability of the coded variables. One-sixth of the tape recordings (30 sessions) were transcribed and then coded with TICOR. Ten tapes were randomly chosen from each of the three measurement periods. This was completed at the conclusion of the study by the trained doctoral student. The researcher independently recoded from the tapes in order to get a reliability score.

Written Comprehension Test Reliability. Because of the somewhat subjective nature of both the answering of the ten short answer comprehension questions and the students' own questions, the same doctoral student who recoded TICOR tapes scored 25 percent of all tests at each measurement period in order to establish an interrater agreement evaluation. Appendices N and O show the recording forms used. Reliability data are presented in the Results chapter.

Analysis of Data

In this section the three MANOVAs and one ANOVA dealing with both TICOR data and written comprehension student data are discussed.

Part I Teacher Training Component. At each of the three measurement periods, three different observations occurred for a total of nine different measurements of each teacher. The reasons for having more than one at each measurement were: (1) a more complete picture of the classroom interaction between teacher and students during discussion; and (2) the possibility of observing more than one format/style used in the discussion of a story. The data were then collapsed over the three days as an average to represent the behavior observed.

A major technique taught to the experimental group was student generation of questions and assumption of the role of the discussion leader. The pilot study indicated that because this researcher was interested in seeing if the teachers were able to ask higher level questions, the experimental group of teachers must be instructed to have one of the three observation days at each measurement period be teacher conducted, where the teachers would ask the questions. All of the days could be teacher conducted but at least one day had to be. It then allowed a collapsing of data in the post and maintenance periods where the teacher conducted the discussion sessions.

A MANOVA (Multiple Analysis of Variance) was used to analyze the teacher data. The teacher data consisted of two treatments (experimental and control groups) by two repeated measures (pre and post) with two dependent variables (responses per minute for Critical I and

Critical II level questions). Maintenance data for the teacher component were not included due to attrition of the students. One teacher had two of her three student groups move between post and maintenance testing. In another teacher's class, one of the students was ill all three days of the last observation period. Both teachers were in the experimental group; it was felt that analyzing full data sets (pre and post) in the first two measurement periods was more appropriate than losing the data of these two teachers. Because two of the four students involved were able to take the written comprehension tests, all three measurement periods could be recorded for the student component.

Part II Student Component. Two separate MANOVAs were run on this data. The first MANOVA was a two treatment (experimental and control groups) by three repeated trials (pre, post, maintenance) with two dependent variables (responses per minute on Critical I answers and percent duration spent on Critical I answers).

The second MANOVA was a two treatment by three repeated trials with two dependent variables (responses per minute on Critical II answers and percent duration spent on Critical II answers).

Both the ANOVA and the MANOVAs were used to determine between group and across trial differences. When a difference was found, the Tukey post hoc test was used to determine the interaction effects.

CHAPTER 4

RESULTS

This study investigated the role of question strategy instruction in increasing student participation in group discussions and increasing reading comprehension with learning disabled students.

This chapter is organized to answer the seven research questions posed in Chapter 1. Figure 2 may help to clarify the issues reflected in these seven questions. Due to the inclusion of multiple dependent measures in this study, three multivariate analysis of variance (MANOVAs) were employed. The data on Critical I and Critical II level dependent variables were collected through the use of Timed Interval Categorical Observation Recorder (TICOR). One MANOVA was used to analyze the teacher asking Critical I and II level questions (this answered research question #1). A second MANOVA was used to analyze the two levels of responses per minute and percent duration of time spent in answering those questions (this answered research questions #2 and #3). The third MANOVA was used to analyze responses to written comprehension reading tests. These comprehension tests examined three basic abilities: answering questions based on the stories read, labeling the type of question asked, and generating questions (this answered research questions #5, #6, and #7).

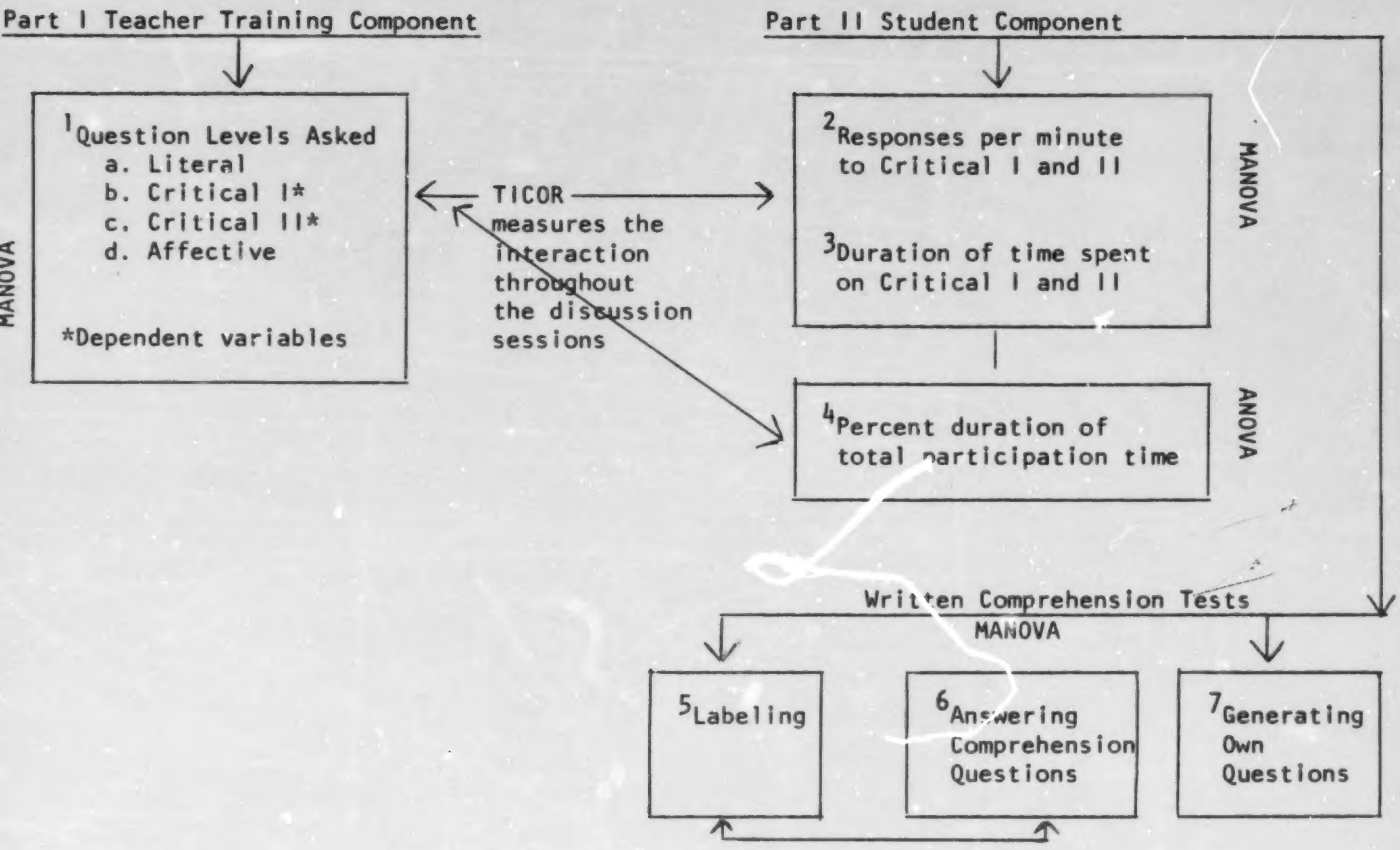


Figure 2. Analysis of the Seven Research Questions

The use of this statistical procedure provided protection from possible alpha slippage by simultaneously accounting for all variables associated with each of the MANOVAs discussed. Where significant overall differences were detected, separate univariate F tests were conducted for each variable.

An analysis of variance (ANOVA) was employed to examine differences between pretest, posttest, and maintenance test data for the two groups concerning total percent duration participation (total talk time) for each of the students (this answered research question #4). A statistical computer program (BMDP 4V, 2V, 1981) was utilized to analyze these data.

When statistical differences were found in interaction of groups and trials, post hoc analyses with the Tukey HSD procedure (Kirk, 1968) were utilized to assess further the MANOVA.

Question 1

Did the group of teachers who received question strategy instruction ask more Critical Level (I and II) questions per minute during the posttesting than the group of teachers who did not receive such question strategy instruction?

Although all levels of questions that the teachers asked were recorded, the purpose of this question is to find out if those teachers in the experimental group asked significantly more Critical I and Critical II questions after the workshops (treatment). To answer this question, the interaction between trials (repeated measures) and

groups is the key aspect of the data. A MANOVA was conducted on the teacher variables: 2 (group) by 2 (trials--pre and post) by 2 (dependent variables Critical I and Critical II level of questions).

As demonstrated in Table 6, there is a significant difference at the .05 level between groups (combined across trials) on Critical II questions and a significant difference between trials (which combine the groups) on Critical I and Critical II questions. There is also a significant interaction of trials by groups on asking Critical II questions.

To determine where the significant differences were, a Tukey post hoc test was conducted on the Critical II level of question. The results are presented in Table 7. It was found that at the .05 level: (1) there was no significant difference between the groups on the pretest; (2) there was no significant difference for the control group from the pre and the post trial measurements; (3) there was a significant difference between treatment groups; for the experimental group who received question strategy instruction, there was a significant increase of asking Critical II questions ($\overline{X}$ = .44) as compared to the control group ($\overline{X}$ = .09) who did not receive the question strategy instruction training. The treatment group scored significantly higher than the control group at posttesting. In other words, after training the experimental group asked significantly more Critical II questions than did the control group. Figure 3 graphically demonstrates the actual difference between the pre and posttesting. For example, before training teachers in the experimental group were asking less than one Critical II question every 20 minutes. After the training the

Table 6. Multivariate Analysis of Variance of Teacher Questions per Minute for Critical Level I and II Questions (Experimental n = 10; Control n = 10)

Source	df	MS	f
G (Group)			
Critical I	1	.07	.44
Critical II	1	.32	5.58
Error			
Critical I	18	.15	
Critical II	18	.06	
T (Trials)			
Critical I	1	.16	5.37*
Critical II	1	.52	7.95*
Error			
Critical I	18	.15	
Critical II	18	.06	
(T) X (G Group)			
Critical I	1	.01	.07
Critical II	1	.28	4.36*
Error			
Critical I	18	.03	
Critical II	18	.07	

*<.05

Table 7. Pre and Posttesting on Critical I and II Questions for the Experimental and Control Teachers

	Critical I		Critical II	
	Pre	Post	Pre	Post
Experimental Teachers (n = 10)				
Mean	.42	.53	.04	.44*
Standard Deviation	.35	.36	.08	.47
Control Teachers (n = 10)				
Mean	.32	.47	.03	.09
Standard Deviation	.19	.27	.07	.07

*<.05

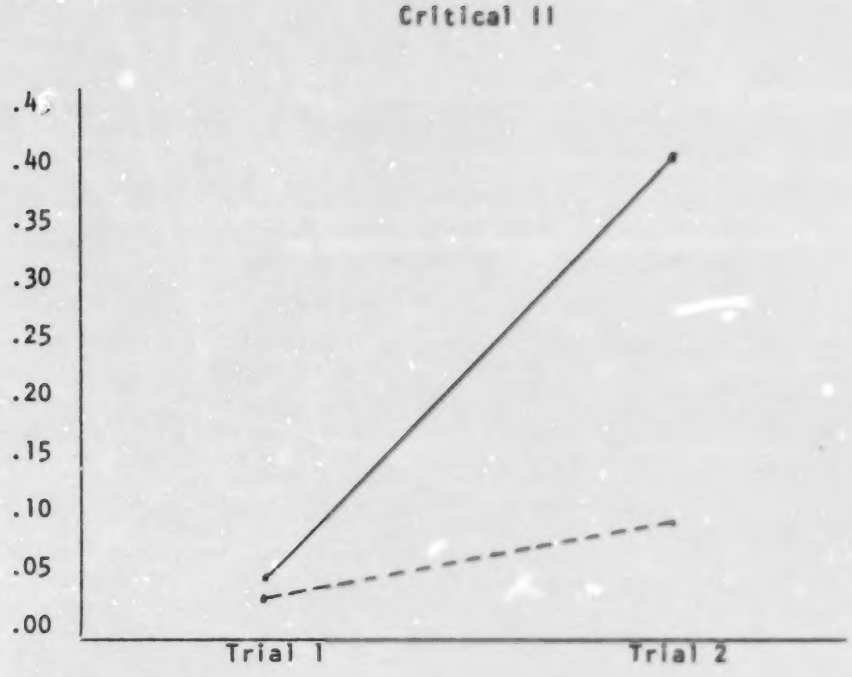


Figure 3. Pre and Posttestings of Means on Critical II Teacher Questions for Experimental and Control Students

experimental group was asking about nine Critical II questions in a 20 minute time span. The control group before training was responding with a little more than two-thirds of one Critical II question in 20 minutes, and after the training the control group was asking slightly more than one and one-half Critical II questions in 20 minutes. Although there is a slight improvement, it does not represent a statistically significant difference. The data support a positive response to question #1, Critical II level; the group of teachers (A_1) who received question strategy instruction did ask more Critical II level questions than did the group of teachers who did not receive such question strategy instruction.

Question 2

Did the group of students whose teachers received question strategy instruction respond with more critical level (I and II) answers per minute during post and maintenance testing than the group of students whose teachers did not receive such question strategy instruction?

A MANOVA was conducted on the student variables. The features of this MANOVA were a 2 (group) by 3 (repeated measures) by 2 (dependent variables levels of questions). Two measurements were taken: responses per minute which is the focus of this question and percent duration of the responses. Table 8 presents the source table for both responses per minute on Critical I and II level questions and percent of time on Critical I and II level questions. A significance level of .05 was found between groups on Critical II responses (combining all measurement periods) and for trials or multiple measurement for both Critical I and

Table 8. Multivariate Analysis of Variance of Student Response Participation per Minute and Percent of Time Duration for Critical I and Critical II Questions (Experimental n = 32; Control n = 28)

Source	df	MS	f
G (Group)			
Critical I response/minute	1	.09	2.65
Critical II response/minute	1	.13	13.41*
Critical I percent of time	1	.77	2.07
Critical II percent of time	1	.75	8.61*
Error			
Critical I response/minute	56	.04	
Critical II response/minute	56	.01	
Critical I percent of time	56	.04	
Critical II percent of time	56	.01	
T (Trials)			
Critical I response/minute	2	8.88	4.36*
Critical II response/minute	2	16.55	8.12*
Critical I percent of time	2	1.89	.93
Critical II percent of time	2	10.78	5.30*
Error			
Critical I response/minute	55	.01	
Critical II response/minute	55	.01	
Critical I percent of time	55	.02	
Critical II percent of time	55	.01	
(T) X (G Group)			
Critical I response/minute	2	.59	.29
Critical II response/minute	2	7.11	3.49*
Critical I percent of time	2	1.95	.96
Critical II percent of time	2	6.00	2.95
Error			
Critical I response/minute	55	.01	
Critical II response/minute	55	.01	
Critical I percent of time	55	.02	
Critical II percent of time	55	.01	

*p <.05

Critical II questions (combining both groups together). However, the answer to the question is reflected in the interaction between trials and groups. There is a difference between measurement periods (after training) between the two groups on the number of Critical II responses per minute for the experimental group. Table 9 lists the means and standard deviations and Table 10 lists the results of the subsequent Tukey post hoc test. It was observed that at the .05 level: (1) there was no significant difference between the groups at the pretest level on Critical II level questions; (2) there was no significant difference across measurements for the control group on the responses per minute on Critical II level questions; (3) there was a significant difference for the experimental group from pre to posttesting in terms of response per minute on Critical II level questions; (4) there was no significant difference for the experimental group between post and maintenance testing; and (5) there was significance between pre and maintenance testing on the type of answers given in terms of response per minute on Critical II level questions. For example, the experimental group of students prior to training was responding with two-fifths of one Critical II level response in 20 minutes; after training the experimental group was responding with Critical II answers one and one-half times in 20 minutes; at maintenance Critical II answers equalled two and one-half times in 20 minutes. Before training the control group gave one-fifth of a Critical II response in 20 minutes. At posttesting they produced three-fifths of a Critical II response in that period. At maintenance two-fifths of a Critical II response in 20 minutes was noted. These changes are slight and represent no statistical difference.

Table 9. Pre, Post, and Maintenance Testing on Critical I and Critical II Responses per Minute for the Experimental and Control Students

	Critical I			Critical II		
	Pre	Post	Maintenance	Pre	Post	Maintenance
Experimental Students (n = 32)						
Mean	.13	.20	.15	.02	.08	.12
Standard Deviation	.17	.19	.11	.04	.10	.15
Control Students (n = 28)						
Mean	.10	.14	.11	.01	.03	.02
Standard Deviation	.09	.14	.10	.02	.04	.03

Table 10. Percent Duration--Summary of Analysis of Variance

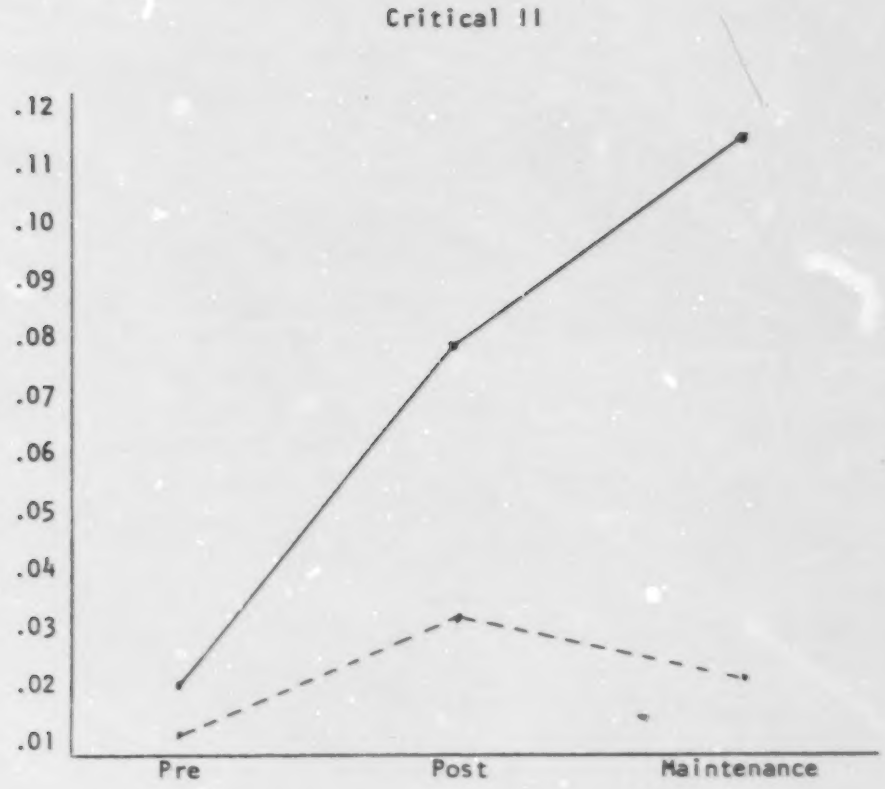
	df	MS	f	p
Mean	1	5303.5	222.02	-
Group	1	13.19	55	.46 NS
Error	57	24.11		
Trials	2	4.75	.73	.48 NS
Error	114	6.5		
Trials X Group	2	2.22	.34	.71 NS
Error	114	6.5		

The group of students whose teachers received question strategy instruction was able to increase the number of responses per minute with Critical II level questions ($\overline{X}$ = .12) compared to the control group of students whose teachers had no training ($\overline{X}$ = .02) as shown in Figure 4.

Question 3

Did the group of students whose teachers received question strategy instruction spend proportionally more observation time giving Critical I and Critical II level answers during the post and maintenance testing than the group of students whose teachers did not receive such question strategy instruction?

Referring back to Table 9, there was no significant difference on the group by trials interaction for percent duration of either



A_1 Experimental
A_2 Control

Figure 4. Student Responses to Critical II Questions

Critical I or Critical II level questions. Although the treatment group gave more responses per minute at the Critical II level during post and maintenance testing, it did not take them more total time to answer these questions.

Question 4

Did the group of students whose teachers received question strategy instruction spend proportionally more observation time in discussion participation activities during post and maintenance testing than the group of students whose teachers did not receive such question strategy instruction?

It was hypothesized that as the students began to ask questions and as they answered higher level questions with more than one word responses, the amount of total participation time would increase relative to the total observation time. Table 10 presents the analysis of variance with 2 (treatments) by 2 (trials--measurement periods) measuring percentage of student talk time during the observation time periods. No significant differences were noted between the experimental and control groups in participation time.

Question 5

Did the group of students whose teachers received question strategy instruction correctly label more questions on the written test at post and maintenance testing than the group of students whose teachers did not receive such question strategy instruction?

The answers to this question are presented in Table 11, and discussed with Questions 6 and 7 below.

Table 11. Multivariate Analysis of Variance of Written Test Responses (Experimental n = 32; Control n = 28)

Source	df	MS	f
G (Group)			
Label	1	2.05	.34
Comp	1	30.67	4.00*
Quest	1	1.18	.29
Error			
Label	57	6.10	
Comp	57	7.66	
Quest	57	4.01	
T (Trials)			
Label	2	11.98	5.88*
Comp	2	1.15	.56
Quest	2	19.67	9.66*
T X G (Group)			
Label	2	1.61	.79
Comp	2	.38	.19
Quest	2	3.09	1.52
Error			
Label	56	2.72	
Comp	56	3.38	
Quest	56	1.66	

*p = <.05

Question 6

Did the group of students whose teachers received question strategy instruction correctly answer more written comprehension questions at post and maintenance testing than the group of students whose teachers did not receive such question strategy instruction?

Question 7

Did the group of students whose teachers received question strategy instruction generate more appropriate questions based on a criterion during post and maintenance testing than the group of students whose teachers did not receive such question strategy instruction?

Questions 5, 6, and 7 are answered with 2 (groups) by 3 (trials) measured 3 different dependent variables in a MANOVA. Table 11 shows that there was no interaction between trials and groups on any of these three components of the comprehension tests. The experimental group of students did not correctly label more questions on the written test, nor did they correctly answer more written comprehension questions. They did not generate more appropriate questions than the students in the control group. Because of this, no post hoc tests were conducted.

In labeling there were significant differences across trials (groups are put together). In answering comprehension questions, there were significant differences between the groups but all trials were put together. The effects of the training cannot be determined. In generating questions, there was a significant difference across trials, but

groups added to that difference. There was no interaction of groups by trials with the written comprehension tests.

Interscorer Reliability

The two instruments used in the scoring system were TICOR and the written comprehension tests. The use of a second rater was necessary to establish the reliability of the scoring system. The qualification and procedure for training the second rater has been discussed in the Methods chapter.

One-sixth of all TICOR tapes were randomly chosen from each measurement period (10 tapes per period). They were transcribed and coded by both the trained observer and the researcher.

The proportion of agreement was computed using the formula:

$$\frac{\text{number of agreements}}{\text{number of agreements + number of disagreements}}$$

(Bi[illegible] et al., 1969)

The results are reported in Table 12.

Table 12. Reliability on TICOR Data

	Student Variables	Teacher Variables
Experimental Group	.94	.76
Control Group	.90	.77

The mean reliability for both student and teacher data is reported. This high reliability is considered acceptable and commendable with this type of educational data. The major discrepancies in the teacher data are based on a difference between raters of literal level questions and related comments made by the teachers. Many times a teacher would make a statement and then add a rhetorical question. For example, Teacher: "That dog was really cute, wasn't he?"

A yes/no question was always coded as a literal level question. Only if there was a verbal response to the above statement/question, the researcher would code it as a comment. This required listening to the very end of the statement before the appropriate modifier was pushed on TICOR. The researcher became very familiar with the style of each teacher as well as waiting that extra second before making the decision. The interrater often would code before listening to the answer which followed.

The mean reliability for written comprehension tests was computed using the same formula as TICOR scores and is reported in Table 13. One-fourth of all the student tests were randomly selected and scored by both the researcher and the second rater.

Table 13. Reliability of Written Comprehension Tests

	Pre	Post	Maintenance
Mean scores	.94	.89	.91

This high reliability is very good and consistent with educational standards.

Summary

This results section was based on seven questions concerning this study. Three MANOVAs (multivariate analysis of variance) and one ANOVA (analysis of variance) were conducted on the data collected by TICOR and the written comprehension tests.

Because all of the questions were asked in terms of two treatment groups and based on a repeated measure design, the interaction effect of groups by trials is the focus of this research.

In two areas this interaction was found. Based on post hoc tests it was determined that at the .05 level: (1) the experimental group teachers were asking significantly more Critical II level questions at posttesting (after treatment) than were the control group teachers; and (2) the students in the experimental groups were responding with more Critical II answers during posttesting and maintenance than were the control group of students.

There were no significant differences found between groups across trials in: (1) percent duration of responding to Critical I and II questions; (2) percent duration in total student participation time; and (3) all three written comprehension tests.

CHAPTER 5

SUMMARY, DISCUSSION AND IMPLICATIONS

This final chapter presents a summary of this study followed by the discussion, educaticnal implications, and implications for further research.

Summary

Learning disabled children have been described as "inactive" learners (Torgesen, 1977). As Torgesen contrasts the active learner with the inactive learner, he suggests that the active learner has a general cognitive awareness and a purposive goal directedness. This "purposive goal directedness" deals with Torgesen's basic tenet that learning disabled children do not realize that they should think of and use task appropriate strategies to aid their own learning.

The active learner's goal directedness is reflected in his/her motivation (Wong, 1979a). As Wong analyzes Torgesen's view, she states that the motivation (of the active learner) is characterized by an intent to learn that ensures sustained and organized efforts at learning. This intent to learn leads to a plan of action finally yielding efficient purposive learning. This active learner seems also aware of the task demands which facilitate the ability to plan.

A question which has not been answered in previous research is: how can the learning disabled student become activated thus becoming an

active participant in the learning process? It is important to investigate specific ways in which this characteristic of inactivity is adversely affecting learning disabled students.

Kirk and Elkins (1975) found that a predominate focus across the country in the remedial efforts of 21 model demonstration centers for learning disabled students was in the area of reading. About two-thirds of the remedial emphasis was in reading.

Reading involves two basic processes: decoding and comprehension. Decoding skills enable the learner to pronounce words correctly. Comprehension enables the learner to take meaning from what is written.

Although L.D. students have difficulty in learning to "break the code" or learning to decode words, comprehension seems to be more complex and involves more students. Lerner (1971, p. 294) stated:

> Disabilities related to comprehension affect many more children than disabilities in decoding. Because of this, the goal has been to identify a reading strategy that could: (1) improve reading comprehension; (2) aid teachers in involving their students in the learning process; (3) help students focus their attention and organize information they are to learn.

A major strategy that both focuses attention and demands that the child become involved in organizing and setting up the learning environment is the questioning skill or strategy. The purpose of this investigation was to study the effects of questioning strategy instruction on the active involvement and discussion participation of learning disabled students, and on their reading comprehension. The study sought to determine if training teachers to ask higher level questions would produce increased participation or greater involvement in the reading and learning process.

Subjects

Part I Teacher Training Component. Twenty randomly selected resource teachers employed by a large urban southwestern school district were selected to participate in this study. These teachers were contacted to see if they had at least three learning disabled students who were in the fifth or sixth grade and who met the specific student criteria.

Each teacher was contacted by the researcher and asked if he/she would be willing to participate in a study dealing with reading comprehension. Teachers were contacted until there was enough for 10 in each group. The experimental group A_1 was told of the observation procedure and the five weekend workshops and the specific dates involved. The control group A_2 was told of the observation procedure and the one-day inservice that was provided after the completion of the data collection.

Part II Student Component. The student subjects were 68 learning disabled students attending the same urban southwest school district. The criteria used to select the student population were as follows: (1) learning disabled students of the randomly selected resource teachers who had agreed to participate in the study. These students had been designated as learning disabled students based on PL 94-142 and the school district's criteria; (2) fifth or sixth graders; (3) identified as having reading difficulties stated by teacher on the IEP; (4) reading on at least a third grade level as measured by a standardized individually administered reading test.

Materials and Instrumentation

Materials included: narrative stories, written on a third grade level; TICOR, Time Interval Categorical Observation Recorder, a microcomputer with typewriter-like keyboard; tape recorder; and written comprehension tests.

Procedures

All teachers and students were assessed during three different measurement periods. A measurement period (pre, post, maintenance) consisted of five days. The first three days the researcher would observe the verbal interaction between teacher and students during a discussion following the reading of a story. The fourth day the students were asked to read a story, answer the comprehension questions and label what type of question each was. The fifth day, students read a story and made up questions based on specific criteria. The experimental teachers A_1 were trained in five weekend workshops covering: (1) Bloom's taxonomy; (2) six phase strategy where the student becomes the discussion leader; (3) specific strategy involving students asking the questions; (4) Taba's level of questions adapted to the narrative story; (5) acquisition and generalization of learning strategies. The control group A_2 received no training.

Scoring the Data

TICOR was used to record the interaction between the teacher and students. TICOR measured: (1) level of questions asked; (2) number of responses per minute based on the length of the observation time; (3)

percent duration of each student in relationship to total observation time; (4) percent duration for each level of question answered.

Comprehension tests were scored. Each portion was graded separately: (1) answering the ten comprehension questions; (2) labeling each question; (3) generating six comprehension questions, two in each specific category.

Results

A significant interaction between groups by trials occurred. The experimental group of teachers A_1 asked significantly more Critical II level questions than did the control group of teachers A_2. The students in the experimental group A_1 answered more Critical II level questions than did the control group. There was no significant difference in either of the duration of participation measurements. There was no significant difference with the interaction of groups by trials in the different components of the written comprehension tests.

Discussion

Six major conclusions of this study are discussed in this section: (1) a relationship exists between teacher questions and student responses; (2) teachers can modify their level of asking questions; (3) learning disabled students have difficulty developing written comprehension skills without direct instruction; (4) teachers can be instrumental in shifting the leadership roles of the teachers and the students; (5) enthusiasm is caught not taught; (6) resource teachers can become catalysts for total staff involvement and student activation. The first three findings are directly taken from the statistical

analyses of the study. The last three conclusions are indirectly based on the study and from observations throughout the study. As each of these areas is discussed, it is suggested that the reader note the role of the teacher.

There is a relationship between questions asked by the teachers and responses given by the students. In this study, when teachers in the experimental group asked more questions requiring synthesis and evaluation (Critical II) thinking, students responded more often at the same cognitive level requiring the use of Critical II answers. Critical II, synthesis and evaluation questions, require the highest cognitive level of thinking (Bloom, 1956). The question "Why didn't the Critical I level questions also rise at a significant level?" may be asked, especially because, according to Bloom, those questions are at an easier level. There are two possible reasons:

1. The critical thinking six-phase strategy presented by Rossi (see Appendix J) emphasized a procedure that asked the students to label what kind of questions had been asked. In the study this type of question was scored as Critical II level because the students had to employ evaluative criteria that they had learned from the Rossi strategy. The students were usually then asked to prove or justify the label given to the questions. This also was scored as Critical II level questions and answers. As the teachers used this strategy, enthusiasm for the use of the strategy increased as the teachers saw their students become actively involved in this activity. The strategy caused the teachers to focus on Critical II cognitive level of questioning.

With more time spent on Critical II questions, there was less time for other levels.

2. Critical I (comprehension-interpretation, application and analysis) questions seemed to be more difficult for the teachers to develop than Critical II questions. The difficulty may be due to the fact that in developing Critical I questions, the inference, relationships or prediction must be made by the teacher before the question can be constructed, e.g., "Based on what you have read, how do we know the coyote was smart?" The teacher must be certain that this story gives enough clues and hints to answer this question before she can ask it. Also, the range of possible answers must be surveyed in the teacher's mind. However, Bloom's taxonomy does seem appropriate when looking at the process of answering questions. Because the hints are in the story, it is assumed that this information is text implicit and easier to extract than a Critical II question where a range of answers is possible and no one answer is solely correct. Thus, Critical II level questions ask the reader to go beyond the text, while Critical I questions draw from text-based information. This explanation may show why Critical II questions for the experimental groups of teachers and students increased per minute from pretest to posttest, but Critical I questions and answers did not.

The second major conclusion is that teachers can be taught to ask higher level questions. Research cited earlier in this study

(Gall, 1970; Guszak, 1972) indicates that 59 to 70 percent of all the questions asked in the classroom are literal level questions. It has been demonstrated that teachers can be taught strategies to increase the cognitive level of their questions. Because of the relationship between teacher questions and student answers, it is hypothesized that inservice and short workshops have the potential of raising the thinking level of learning disabled students. If the foregoing is true, the quality of such inservice becomes an issue.

Joyce and Showers (1980) set up criteria for inservice by first identifying four levels of impact on teachers from inservice: awareness, concepts and organized knowledge, principles and skills, and application and problem solving. "Only after this fourth level has been reached can we expect impact on the education of children" (Joyce and Showers, 1980, p. 385).

Further definition of this concept is found in the major components of training suggested by Joyce and Showers which have similar characteristics to the experimental treatment used with group A_1 in this study: (1) presentation of theory or description of skills and strategy; (2) modeling or demonstration; (3) practice in simulated and regular classroom settings; (4) structured and open-ended feedback; (5) coaching for application.

Each of the five workshops was organized to address these components; the Friday night was used to present an overview of the session, basic theory and presentation of the basic elements of the weekend's content. The first hour on Saturday involved feedback (handing back assignments) and discussion of any problems concerning the

previous week's assignment. The rest of Saturday was spent in modeling or demonstrating a questioning technique with simulated practice. Coaching occurred as a result of feedback to the experimental group on assignments and at the times of classroom observation. The components of the training sessions offer a possible explanation of the success in modifying teachers' questioning behaviors found in this study.

The third conclusion is based on the fact there were no significant differences in performance on the written comprehension tests taken by students pre and post treatment and one month later. This study emphasized oral discussion and the strategies used to involve students in discussion participation, not in written responses. The research concerning the inactive learner indicates that learning disabled students do not pick up incidental strategies on their own. In the strategies taught, no attention was placed on the use of written language. The learning disabled students did not improve in answering written comprehension questions, labeling those questions and generating questions of similar types. It seems probable that these students did not develop the written language skills necessary for success on the written comprehension tests because they did not transfer those strategies learned in the oral discussion format. Had the comprehension tasks been administered orally, students may have been able to answer these questions satisfactorily.

The fourth conclusion based indirectly on this study and on observations throughout the study is that teachers can be instrumental in shifting the roles of the students and the teacher. In a classroom atmosphere, teachers are traditionally viewed as: (1) summarizing or

restating student comments during discussions; (2) asking questions to maintain discipline, check attention, and evaluate student comprehension; (3) being the authority; (4) knowing all the right answers; and (5) keeping control by outlining the rules and consequences.

For the teachers to break away from this behavior pattern, after much modeling, the teacher must make a conscious decision to: (1) encourage students to ask questions, no question being labeled inappropriate or foolish; (2) allow the students the opportunity to summarize each others' comments, trying not to repeat student answers; (3) let the students problem solve and come up with the answers, seldom offering an opinion or judgement; (4) share the leadership role; and (5) involve the students in outlining the class rules and resulting consequences.

The third phase of Rossi's critical thinking technique allows the student to become the discussion leader. The phase encourages students to listen to each other, begin to justify and trust their own thinking and to realize that the teacher is no longer the authority. The students begin to talk to each other with respect and interest; leadership qualities begin to develop. This technique is a way to switch the roles of student and teacher. This change will not occur overnight. At first the sessions may be somewhat automatic as student leaders try to follow models established by the teachers. At first this discussion process is the important focus. Later accuracy, as determined by the students, becomes the focus. Teachers may need to do additional modeling periodically.

This study demonstrated that teachers were able to share the leadership role and four of the ten experimental teachers were able to

turn over the entire discussion period. The focus of the classroom was no longer on the teacher, but she was responsible for making the switch to student directed involvement.

The fifth conclusion is based on the old saying, "Enthusiasm is caught and not taught." Throughout the study, session after session, the truth of this statement was demonstrated. If the teacher would say: "This is a terrific story, I know you will like it," "This story reminds me of another story that we've read," This story is really strange, I'm not sure if I believe it really happened; you read it and tell me what you think," "Have fun with this one," students would come alive as they started to read. This is part of a purpose setting technique used before reading that enhances comprehension and helps to focus student attention on the important components of the story. If the teachers enjoyed re-reading the story while the students were reading, as opposed to checking papers, the students knew the teacher was interested in the story. If teachers had good eye contact with the students during the discussion and literally sat on the edge of their seats and listened to what each student said, the students felt that the discussion was important.

The students viewed the "teacher-less discussion" phase of Rossi's technique as a time when their ideas were important and enthusiasm was high. For example, one boy had been ill and still had a slight fever, but he insisted that his mother bring him to school during the resource hour because he did not want to miss his turn as discussion leader. No one can teach a student to be excited or enthusiastic about the reading or thinking process, but if the teacher sets

the stage, laughs or cries with the class at a story, and respects their reaction, the enthusiasm is shared.

The sixth conclusion is that resource teachers can become catalysts for total staff development, staff involvement and student activation. Many of the experimental teachers asked principals, parents, and counselors to come in and watch some of the strategies being used. Students went back to the classroom and explained what they were able to do. Parents verbalized to the teachers that their child now loved reading. Seven different inservice workshops have been planned by the experimental group of teachers, six of them on a building level, and one by the teachers in the pilot study on a district level. After the one-day inservice, one additional control group teacher got in touch with the researcher and viewed many of the videotapes of the various weekends and is planning to present a two-day workshop for her teachers. Involving learning disabled students in reading comprehension is not just a resource room goal, it should be a school-wide objective for all students. These teachers feel prepared and able to share what they have learned with their peers and their students.

Each of these conclusions emphasizes the importance of the teacher; teachers' higher level questions yield higher level student responses. Teachers can change. Direct instruction by the teacher is vital for the inactive learner. Teachers establish an appropriate climate for student involvement. Teachers' enthusiasm is infectious. Teachers may become staff trainers and curriculum developers after appropriate training and experiences.

Implications for Education

It has been found that as the teacher employed higher level questions, students would engage in higher cognitive thinking to respond to those questions. It has also been demonstrated that well developed workshop or inservice planning can affect teacher change. For these reasons, it is suggested that teachers be provided inservice experiences concerning the levels of thinking and questioning. Techniques in questioning should be provided for the purposes of: (1) modifying teacher behavior; (2) eliciting higher cognitive level responses from students; (3) activating the inactive learner through participation in the learning process. When workshops are conducted, it is recommended that the steps outlined by Joyce and Showers (1980) be used.

When programming to teach new learning strategies or specific skills, it is recommended that the acquisition steps (Deshler, 1983) be closely followed (see Appendix L). If a series of workshops or inservice programs are scheduled over an extended period of time, the acquisition steps should be presented first. As each of the learning strategies are presented, the teacher will know how to implement them systematically in the classroom.

Teachers may be aware of the research on the lack of incidental learning among the students with learning problems, but fail to implement this knowledge in their teaching practices. For this reason, it is necessary for teachers to examine the objectives of their lessons and then teach to accomplish those objectives.

Implications for Research

Research implications will be discussed in two parts: re-examination of the data from this study and suggestions for further research.

Re-examination of the Data

Many additional possibilities exist in re-examining the data. Each of the written comprehension stories and accompanying comprehension tests needs to be looked at to see if there were any story effects. The randomization of story presentation for written testing was employed to control for story effect but each story at each measurement period should be statistically examined.

A second area in re-analyzing the data would address each area of the comprehension tests. Did the students improve on any type of question asked? In this study the data were not analyzed by level of question, thus possibly obscuring data indicating change at one of the levels. Upon observation, the students seemed to be able to generate fact and opinion questions more easily. Data on the various types of questions generated needs to be explored more fully.

Further Research

If a similar training program were to be adopted, three basic components might be changed:

1. Acquisition and generalization steps should be taught in the first workshop. As the teachers were introduced to new techniques, they could in turn teach their students, having in mind the sequential steps necessary to assure success.

2. Greater emphasis should be placed on direct instruction dealing with answering and asking questions in written form.
3. All students participating should be given pre and post reading tests with a comprehension component. Analysis of high and low readers might be done.

The use of expository stories instead of narrative is a natural extension. Age level, interests and background knowledge may all be factors that might be considered and built into the design.

When using two groups, it might be appropriate to compare the normal students to learning disabled students instead of two L.D. groups. Deshler (1983) has indicated that some techniques, like the research on advance organizers, were helpful for L.D. students but did not seem to benefit the regular student very much.

Many strategies have systematic, very structured components. Learning disabled students who have difficulty organizing may find this helpful, whereas normal students may do certain organizing naturally and additional structuring may not affect their performance.

APPENDIX A

TEACHER DATA SHEETS

1. Chronological age range

____21-25	____41-45
____26-30	____46-50
____31-35	____51-55
____36-40	____56-60
	____61-65

2. Education

____College (2 years)	____Master's (M.Ed., M.A., M.S.)
____College (4 years)	____Master's + 1-10 hours
____B.A. or B.S. + 1-10 hours	____Master's + 11-more hours
____B.A. or B.S. + 11-more hours	____Educational Specialist

3. Total years of teaching (excluding student teaching); count this year

____1-3	____16-18	____28-30
____4-6	____19-21	____31-33
____7-9	____22-24	____34-36
____10-12	____25-27	____37+
____13-15		

Number of years in the L.D. Resource Room_____

Number of years teaching in your current district_____

4. Salary scale (this year)

____$ 9,999 or below	____$18,000-$19,999
____$10,000-$11,999	____$20,000-$21,999
____$12,000-$13,999	____$22,000-$23,999
____$14,000-$15,999	____$24,000-$25,999
____$16,000-$17,999	____$26,000+

5. Number of reading courses beyond B.A. or B.S. degree

_____ approximate hours _____

Number of inservice hours in reading (in district)

_____ approximate hours _____

6. Rate your level of competency in teaching reading to learning disabled students

5 4 3 2 1
Strong Weak

APPENDIX B

DISTRICT PLACEMENT GUIDELINES

Definitions: Federal and State

"Specific learning disability: means a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, which may manifest itself in an imperfect ability to listen, think, speak, read, write, spell or do mathematical calculations (U.S.O.E., 1977). "The term does not include children who are having learning problems which are primarily the result of visual, hearing or motor handicaps, mental retardation or environmental, cultural or economic disadvantage" (State Revised Statutes 15-1013).

Criteria

1. Discrepancy between intellectual ability and actual achievement (performance).
2. Information processing abilities and disabilities.
3. Elimination of exclusionary factors.
4. The need for special education services that are required because the student cannot learn through ordinary methods of instruction.

Terms

Intellectual ability--student must obtain a global score no more than two standard deviations below the mean on an individual test of intelligence.

Discrepancy--significant discrepancy between ability and performance must be present. Some guidelines suggest functioning at or below 50% expected achievement level in relation to ability and age. When standard scores are used, at least 1 to 1/2 standard deviation from mean (stanine 2).

Process--basic psychological processes: (a) visual, (b) auditory, (c) haptic, (d) receptive or expressive language, and (e) sensory integration.

APPENDIX C

MICROCOMPUTER APPLICATIONS IN INTERACTION ANALYSIS

Interaction analysis data are typically collected using paper and pencil measures. With such measures there is considerable difficulty in identifying the sequential flow of behaviors, the simultaneous occurrence of several behaviors, and the duration of the behaviors. To overcome these problems, the Timed Interval Categorical Observation Recorder (TICOR) was developed. The TICOR is a portable, battery powered microcomputer designed to automate the collection of sequential and simultaneous behavioral observations and their associated durations. Up to 64 variables may be defined by the researcher (e.g., instructing, questioning, or illustrating) and coded by depressing one of the 64 keys on the TICOR keyboard. Second and third order modification of variables are also possible by depressing the two or three keys which have been previously defined. The data are recorded electronically on a microcassette which is later analyzed by the TICOR Data Analysis Computer (DAC) to provide summary reports of the variable frequencies and durations and profiles of sequential and simultaneous variables. Advanced interobserver reliability and data analysis procedures (e.g., SPSS) are available. The microcomputer is programmable in FORTRAN and has the capability for collecting covert responses from student response pads and analog input from autonomic responses (e.g., heart rate, GSR, etc.).

The system has been used in teacher effectiveness studies, bilingual education studies, mental health research, and physical education research.

APPENDIX D

TEST

Coyote!

Directions: Read the story. Answer the questions. Then tell what kind of question is being asked.

1. What do coyotes eat?
2. How did Gramp and Jenny know that the coyote was still alive?
3. How many baby coyotes did the mother have?
4. Why do ranchers fear coyotes?
5. What was Gramp and Jenny's special secret?
6. How do you know that the poison and traps might kill the coyotes?
7. Baby cows are called calves. Baby coyotes are called _____.
8. How do we know this coyote was pretty smart?
9. How do you feel about Gramp going against the wishes of the other ranchers? And why?
10. What is the name of the place where coyotes live?

Look at each question. Write on the life beside each question whether the question is fact = F, inference = I, or opinion = O.

APPENDIX E

QUESTION FORM

Name_____

School_____

Story Number_____

Directions: Read the story. Make up some questions about this story.

Two fact questions:

1. _____

_____

2. _____

_____

Two inference questions:

1. _____

_____

2. _____

_____

Two opinion questions:

1. _____

_____

2. _____

_____

APPENDIX F

RANDOM ORDER OF STORIES USED FOR DISCUSSION

Teacher S

Experimental	Pre	Post	Maintenance
5	1, 14, 16	17, 18, 8	12, 5, 10
10	16, 1, 17	18, 10, 5	14, 8, 12
12	18, 10, 14	8, 1, 12	17, 5, 14
13	8, 5, 12	1, 17, 16	8, 10, 5
14	10, 8, 14	18, 5, 12	17, 16, 1
18	16, 17, 18	8, 5. 10	12, 14, 1
19	14, 18, 17	5, 16, 12	1, 8, 10
20	5, 10, 12	17, 18, 8	16, 1, 14
22	16, 8, 5	10, 12, 7	18, 14, 1
23	10, 5, 16	12, 14, 18	17, 8, 1
Control			
1	18, 8, 5	10, 12, 17	14, 1, 16
2	17, 12, 1	8, 14, 18	5, 16, 10
3	14, 17, 10	8, 1, 12	16, 18, 5
6	8, 16, 18	1, 12, 14	5, 10, 17
7	17, 18, 1	8, 12, 5	10, 14, 16
8	1, 18, 8	12, 10, 14	5, 17, 16
11	16, 8, 12	18, 10, 1	17, 5, 14
17	17, 18, 1	16, 10, 12	14, 8, 5
21	14, 1, 16	8, 18, 17	12, 10, 5
24	10, 5, 1	14, 12, 16	18, 8, 7

APPENDIX G

SAMPLE USED FOR INSTRUCTION

IN LABELING QUESTIONS

Short Story: Tom was going to school. He saw the bus coming and ran as fast as he could. But Tom missed the bus! He got on the next one. Then Tom dropped his money. The coins rolled all over. Tom had to pick up his money. At last, he put it all in the fare box. He sat down. He relaxed and looked out the window. Then Tom got a surprise. He saw his school. Tom had forgotten to get off the bus in time (World Book Reading Development Program, 1981).

_____ 1. Did Tom miss the bus?

_____ 2. What tells us that the boy didn't have his mind on what he was doing?

_____ 3. Based on what you read, what do you think might have happened before Tom went to school?

F = Fact

A fact question can be answered by information that is directly written in the story.

I = Inference

An inference question is a thought question that can be answered by putting together clues in the story--like putting pieces to a puzzle together.

O = Opinion

An opinion question is also a thought question but this question can be answered by telling what you think or how you feel. There is more than one right answer.

APPENDIX H

STORIES USED FOR WRITTEN TESTS

Teacher Numbers Experimental	Pre	Post	Maintenance
5	22, 21	9, 13	3, 15
10	9, 21	13, 3	15, 22
12	15, 22	13, 3	21, 9
13	3, 15	21, 9	13, 22
14	13, 9	21, 3	15, 22
18	15, 22	9, 21	13, 3
19	3, 9	22, 13	21, 15
20	22, 9	3, 21	13, 15
22	21, 3	22, 9	15, 13
23	3, 21	22, 13	15, 9
Control			
1	9, 13	13, 15	21, 22
2	15, 3	22, 13	9, 21
3	13, 15	3, 22	21, 9
6	21, 9	22, 3	13, 15
7	15, 3	9, 22	13, 21
8	3, 15	13, 21	9, 22
11	13, 21	3, 15	22, 9
17	22, 15	21, 3	9, 13
21	9, 15	21, 13	3, 22
24	9, 3	15, 13	21, 22

On the stories listed first in each column, the students were asked to answer comprehension questions and label the type of question it was. On the stories listed second in each column, students were asked to generate their own questions.

APPENDIX I

WORKSHOP 1--BLOOM'S TAXONOMY

Presented by Delva Daines, Brigham Young University, Provo, Utah

Recognizing Questions at Six Cognitive Levels

Knowledge level questions place emphasis on recall or memory processes. Responses include the recall of: specific facts, terminology, trends and methods, specific ideas, principles, theories, and generalizations.

Comprehension questions focus on the students knowing what is being expressed in the literal message contained in a communication. Responses to such questions include the translation of a message into another form of communication, an interpretation of interrelationships among major ideas, and the extension of ideas to make an inference or prediction.

Application questions focus on having students use previously acquired knowledge to solve problems in new or unique situations. Part of the challenge lies in the students being able to determine the appropriate process to use. Responses to questions at the application level require students to use their information and understanding to solve problems.

Analysis questions emphasize the breaking of given information or materials into their component parts, and focusing on the relationships between these parts and the total organization. Responses to questions at the analysis level require an analysis of elements or parts, the analysis of relationships, an analysis of arrangements or organization, and the determination of cause and effect.

Synthesis is the opposite of analysis. Synthesis involves the placing of parts together to form a whole, a combining of parts in such a way as to form a pattern not clearly evident before. This category provides for divergent or creative thinking, and students are expected to work within the limits set by the particular problems or materials. Responses at the synthesis level are expected to include the production of a unique communication, a production of a plan or proposed set of operations, and the derivation of a set of abstract relations.

Evaluation questions are considered to be the most complex part of the taxonomy. The evaluative process may in some situations be a prelude to seeking new knowledge, comprehension, application, a new analysis or synthesis. Evaluation, to some degree, can be used at each level of intellectual activity. For example, students need to evaluate the effectiveness of his understandings or application, etc. Responses to evaluation involve the making of judgments about ideas, solutions, methods, and values. The judgments are to be based either on internal or external standards (on criteria).

The Affective taxonomy published by Krathwohl and his associates consists of five divisions. Since the emphasis of this workshop is on Bloom's taxonomy of cognitive processes, the processes for affective questions are condensed into general statements. Teachers using affective questions elicit responses from students that relate to some form of their value system. An affective taxonomy, or classification system, is used to deal with questions about interests, appreciations, attitudes and values. All levels of an effective system have a cognitive component, and the cognitive categories contain affective components. Affective questions should be present in oral and written dialogue, although not all divisions need to be utilized in any particular lesson.

Definitions taken from Delva Daines, Reading in the Content Areas: Strategies for Teachers. Glenview, Illinois: Scott, Foresman and Company, 1982.

It is easier to recognize questions when they are grouped according to particular categories than when questions at various cognitive levels are intermixed. Read the following questions, identify the cognitive levels and record the reasons for your decisions (judgment).

1. Where did Amelia's parents spend the afternoon?

2. Determine the unknown ingredient used in the compound.

3. Draw a picture of John's make believe playmate as described by the author.

4. Read this editorial and identify the views with which you agree.

5. Defend the conclusions Ben made about Jack.

6. Examine the city map and determine where to recommend the location of the next playground.

7. Write a sketch of the heroine's father.

8. Determine what caused Ben to have such bitter feelings about Josh.

9. List the procedures to follow in writing a mosaic poem.

Explicating Patterns of Organization

Patterns of organization in written materials are used to help writers communicate their thoughts in print, and to assist readers comprehend, analyze, and recall textual information. Knowing the structure of connected discourse serves as a guide to help students deal with the information before they are required to utilize it in answering questions. A few of the patterns of organization are shown below.

1. Arrangement/Sequence: This pattern requires a reader to place a logical arrangement and sequence.

   Example: Ann was well liked by her peers, and she volunteered to participate and assist others in many activities. Her teacher gave Ann a recommendation to serve as a tutor for some of her classmates. Ann never missed school unless she was ill. She was a high achieving student.

   These ideas could be placed in the following order:

   1. Ann was a high achieving student.
   2. Ann never missed school unless she was ill.
   3. Ann was well liked by her peers.
   4. She volunteered to participate and assist others in many activities.
   5. Her teacher gave Ann a recommendation to serve as a tutor for some of her classmates.

2. Cause/Effect: This pattern links at least two reasons with consequence or results. This is an action and a result from that action.

   Example: Because the lake flooded the fields, the crops were planted late in the season.

3. Compare/Contrast: These patterns make evident the apparent likenesses and differences between two or more things.

   Example: The robin is classified as a diurnal animal; however, the bat is a nocturnal animal.

4. Time Order: This pattern shows a sequential relationship between ideas or events over a passage of time.

   Example: John and Mary moved west to homestead a large ranch. First they planted crops, and now they are erecting fences around the ranch.

5. Problem Solving: This pattern is exemplified by an interaction between at least two factors. One factor cites a problem, and another factor suggests a potential answer to the problem.

Example: The plants were not growing well. Therefore, the soil was analyzed, and then the needed minerals were added to the soil. The plants are now maturing and showing a healthy color.

6. Simple Listing: This pattern consists of a listing of ideas, items or events. The order of what is listed is not considered significant.

Example: Before the Roland family went on a picnic, they loaded food, chairs, sweaters, balls, and finally some fishing equipment in their car.

Key or signal words help students recognize the above listed patterns. Sample words are:

Arrangement/Sequence: order, first, second, next, last.
Cause/Effect: because, consequently, since, therefore.
Compare/Contrast: as well as, but, however, not only, unless.
Time Order (date): after, as before, not long after, now, when.
Problem Solving: because, consequently, therefore.
Simple Listing: before, begin with, finally, next, secondly.

Ways to teach patterns of organization in materials are:

1. Modeling the ideas by the teacher before students are expected to recognize them.

2. Teaching students about the patterns before they use them in assignments.

3. Practice in using the information under a teacher's guidance.

Teaching children some basic elements about literature is another factor in assisting them to answer higher level questions. A few of these many elements are:

1. Setting: types and functions

2. Character: appearance, speech, actions, comments by others, stereotypes, dynamics, etc.

3. Plot: chronological order, flashback, conflict against self, others, society, and nature, patterns of climax

4. Style: writing through imagery, figurative language, simile, personification, connotation, cadence, humor, motif

5. Tone: author's feelings about subjects and readers

Explicating Levels of Comprehension

When students encounter difficulty answering questions, it may be that they need to be taught how to analyze the question to answer it. Pearson and Johnson (1978) suggest a procedure to follow in teaching levels of comprehension to help students answer questions and recall information from text materials. The following Question-Answer Relationship (QAR) is a question-answer strategy for students. When teaching QAR the teacher should provide students with immediate feedback, let students progress from using group to independent activities, and provide progression from working with single tasks to more difficult tasks.

Levels of Comprehension

1. Textually explicit: The answer to the question is taken directly from the text. Students can point to and read the answer as stated by the author.
   - Sample question: "What was Joan riding?"
   - Sample answer: "Joan was riding her brother's bicycle."

2. Textually implicit: The answer to this type of question is not as obvious as a textually explicit question. However, the answer will be derived from the text. After students read facts from a passage an inference, based on the facts, is made.
   - Sample question: "Why did Joan have the problems riding her brother's bicycle?"
   - Sample answer: "She zigzagged down the street," and "Her feet just barely reached the pedals."

3. Experientially-based: An answer to this type of question is derived from a student's existing schemata. An inference is made that is based on their previous knowledge and experiences. The information is relevant to the passage but does not appear in it. Divergence in student answers would be expected.
   - Sample question: "Why did Joan find herself on the ground?"
   - Sample answer: Students might assume from their experience that riding a bicycle necessitates maintaining balance.

Textually implicit comprehension requires some thought on the part of the students. The answers are not explicitly stated by the author, but the answer is derived from the language of the text. There are no obvious clues in the passage and students have to infer what was meant by the author. The less the text provides cues, the more students rely on their experiential background.

Experientially based comprehension necessitates that when a question is asked the answer is derived from previous knowledge. The answer is not directly derived from the reading test. It goes beyond reading between the lines, and inferences are drawn from previous knowledge.

APPENDIX J

WORKSHOP 2--QUESTION STRATEGY

Presented by Joan Rossi, Foster City Reading Institute, Foster City, California

Questioning and Writing: A Device for Developing Critical Thinking Skills

Phase I: Introduction to Questioning--Fact, Thought, Opinion

Much use has been made of taxonomies; however, very often they have been the tools of the teachers, many of whom feel most comfortable approaching questions deductively. With the current goal of the development of independent thinking and problem solving, we feel that students attain this goal by being involved at the ground level. This calls for an inductive approach.

During Phase I, differentiating among the three levels of questions, we recommend the use of familiar fairy tales in order to remove the reading variable and focus on the process. We advise starting with a small group, not more than ten.

Steps

1. Choose a fairy tale--e.g., "Cinderella" and read it to the group.
2. Ask for questions centered around the fairy tale, for example:
   What did Cinderella lose as she ran from the ballroom?
   Why did the step-mother and step-sisters lock Cinderella in her room when they tried on the slipper?
   What do you think happened to her step-mother and step-sisters after Cinderella got married?
3. a. Ask students which questions could be answered directly by using the story.
   b. Ask which ones must be answered by putting facts together and coming up with a conclusion.
   c. Ask which questions require stepping out of the story and drawing one's own conclusions.
      (a) fact (directly written)
      (b) thought (retrace)
      (c) opinion (brainstorm)

4. Ask students to suggest labels for each category. Discuss and modify category labels. A pre-activity is to ask students to categorize objects in more than one way and choose specific language to label these categories.
5. Choose another story--e.g., "The Ugly Duckling" and have the students read it silently to themselves. Ask them to "think write" about the material as they read. They record what is going on in their head as they are reading. They want to capture any impressions or questions that come to mind.
6. Divide the students into pairs and ask them to share their "think write" responses and then find, or make up two questions for each category. Each question should be labelled and handed in.

Phase II: Teacher Modeling

1. Assign a basal story to one reading group with questions from the manual. Ask pairs (at their seats) to identify the type of question, give the answer, and put down page and paragraph numbers where answers can be found. (May not have evidence with opinion questions.)
2. After the pairs have completed the assignment, meet with the group in a circle on the floor or at a table to discuss "Group Guidelines."
3. Lead a discussion asking for the kind of question each pair decided upon, referring to their answers as evidence.
4. The group discusses their interaction and sets up goals for future discussion according to "Group Guidelines." Sometimes role playing the following types of behavior can be enlightening as well as fun: dominator-monopolist, hostile-aggressive, silent, playboy-clown.

This process may need to be repeated several times using different stories to allow students to become proficient in group interaction.

Phase III: Teacher-less Discussion

1. Assign a story or short reading in science or social studies.
2. Individuals respond with think writing.
3. Ask pairs to share their responses and make up one question in each category.
4. Ditto questions.
5. Individuals answer, citing references and labelling questions.
6. The group meets in the discussion setting and the teacher reviews "Group Guidelines" and goals set at the last discussion.

Teacher Objectives	Group Guidelines	Discussion Suggestions
tudents will not insist on greements in discussion in he category of opinion uestions.	A. We will not label answers to opinion questions right or wrong. B. Fact and inference labels will be agreed upon after all evidence is shared.	We may not be able to come up with an answer on which we all agree, but we would like to hear as many opinions as possible.
tudents will judge the nswer, not the person esponding.	We will talk about answers, not the people giving them.	"What makes you think so?" "Would you show us where in the story you found this?" "What additional information is there to support your answer?"
tudents and leaders will sk for back-up to answers.	If we disagree, we will ask for back-up.	
	If we don't understand what someone has said, tell him or her what you think the person is saying.	"I hear you saying this . . . . Is that correct?"

Evaluation

Given a copy of "Group Guidelines" students answer the question, "How did we do?" for each guideline.

7. The teacher appoints a group leader.
   Leader's guidelines:
   a. Read the questions.
   b. Ask for back-up.
   c. Ask for agreement and disagreement.
   d. When all opinions have been heard, summarize what the group has said, whether they have come to a conclusion or not.
8. Videotape a discussion session.
9. Play back the tape and have the group evaluate through discussion again setting goals for the future.

Changing Role of the Teacher

The teacher progresses through each phase with the goal of shifting the responsibility of developing and answering questions, and interacting as a group, to the students without his or her active participation. This may seem simplistic, but after the "Teacher Modeling Phase" (which may take anywhere from two weeks to a few months), the students should be familiar enough with the process to function independently. In the "Teacher-less Discussion Phase" the teacher must refrain from making any comments and answering or asking any questions. We suggest that the group sit on the floor or around a table to provide maximum eye contact and group interaction. The teacher should be part of the group in the "Teacher Modeling Phase," but should sit to the side in the "Teacher-less Discussion Phase." If the teacher finds that there are too many problems with this last stage, he or she may return to the "Teacher Modeling Phase."

Once the group feels comfortable with the "Teacher-less Discussion," this process need not be confined to the area of reading, but may be implemented in science, social studies, etc. A natural extension to the process is to have students write well-written paragraphs to answer their own questions.

Phase IV: Writing

The reading group now begins to function as a writing group. The initial groundwork for working together has been set. By this time there is a feeling of closeness among group members, yet they appreciate their individual personalities and opinions. They can be more direct with one another and are more willing to take risks. They are better listeners and are able to follow a train of thought attentively for a long time. There is a feeling of "let's explore together."

Steps

1. After the "Teacher-less Discussion Phase," the group reviews their inference and opinion questions and selects questions they might like to write about. They may wish to add new questions if the discussion has exhausted all possibilities for original ideas for writing.

2. Or, depending on the material, they may want to meet in a teacher-less discussion for the sole purpose of selecting questions. At this point their think writing can often take the place of discussion and provide enough ideas for responding to questions in writing.
3. Students have the option of individually choosing questions or all writing on the same question.
4. They write an initial draft concentrating on quality of thought, not mechanics.

Steps to Follow (Writing Answers to Easy Questions)

1. Children make up their own questions (either inference or opinion). Teacher checks. (Teacher may give questions to younger children.)
2. Children put down all possible ideas to answer questions. These should be words or phrases in random order. Teacher checks.
3. Children delete all ideas that don't fit; they can sequence ideas and group into paragraphs. Teacher checks.
4. Children put ideas into sentences and paragraphs. Teacher checks.
5. Put on ditto for discussion and editing. Do not put names next to paragraphs.

Phase V: Response

Once the group is ready to begin their writing, the teacher needs to re-enter for a short time as a participating member to discuss "Advice to the Reader/Listener/Responder" and "Helpful Response Questions." She can help the group to engage in the writing by modeling response questions and the techniques of "pointing," "telling," etc. When first working as a writing response group, students tend to rush through one member's paper so theirs can be shared. She must help students elicit suggestions for change without giving answers. It usually requires about 20-30 minutes to comfortably respond to one piece of writing. Breaking the group of ten or so in half can work, so meetings can be hour sessions for two days.

Steps

1. One member distributes a copy of his writing to each person in the group. He or she reads orally as the group reads silently.
2. Members point out specific phrases or ideas which strike them, ask the writer questions, tell what happened to them as they tried to listen, offer ideas for changing the speaker, etc. It is important to start with positive comments.
3. The writer may ask for specific help on certain things and make some notes on ideas for revision.
4. The writer has the last say as far as what changes he or she wishes to make. The object is not to conform to the group.

5. When the group feels comfortable in moving on (or if time needs to be considered), another member may share.

Phase VI: Revision

The goal is for the audience (the response group) to provide enough feedback to encourage the writer to revise through several drafts if necessary. If the response has been thorough, the writer will have a good focus for revision and will maintain interest in the workings of his or her paper.

Steps

1. Members work on second drafts and experiment--they may change their focus, include dialogue, change speakers, write a letter--whatever feels more honest and exciting.
2. The revised writing can:
   a. Go back to the group for more response.
   b. Go to the teacher who may want to comment on its progress, in a private conference or collect it for comment. (Sometimes the teacher can keep it for a while if the student needs some distance from it.)
3. Finally, the teacher may meet again with the group, set up individual conferences, or write comments and make corrections on drafts to improve mechanics.
4. In a group meeting:
   a. Members reread their copies silently as the writer reads aloud. (Many children do not place periods between sentences yet read as if they were there.)
   b. The teacher begins posing questions like, "Where do you hear the first sentence ending?"
   c. All members make corrections on their copies.

The teacher needs to determine what specific mechanics should be worked on first, as correcting every single error is not only too tedious, but detracts from learning and being able to apply a new skill well. It is amazing how mechanics improve just through the process of revision.

APPENDIX K

TABA'S COGNITIVE THINKING LEVELS

Presented by Margaret Dixon, using notes and materials of Dr. John Bradley, University of Arizona, Tucson, Arizona

Taba's Levels of Questions

1. Opening Question	Elicits a universe of facts
2. Focusing Questions	Focus on specific facts to be later compared or related
3. Lifting Questions	Ask students to compare, contrast, form relationships, make predictions, draw conclusions based on factual data
4. Supporting Questions	Call for clarification, examples, experiences, or synthesis of ideas
5. Generalizing Question	Asks students to form a relationship between concepts and to make a statement about it

APPENDIX L

WORKSHOP 5--LEARNING STRATEGIES

Presented by Donald Deshler, University of Kansas, Lawrence, Kansas

Acquisition Steps

1. Analysis of current learning habit
   - Make student aware of inefficient/ineffective habits
   - Provide baseline data of current functioning

2. Describe the new strategy
   - Provide a description of an alternative approach
   - Describe steps in new strategy

3. Model the new strategy
   - Demonstrate entire strategy, "Thinking Aloud"

4. Verbal rehearsal of the steps
   - Verbally rehearse steps to an automatic level

5. Practice in controlled materials
   - Materials at student's reading level
   - Materials conducive to learning strategy without content demands

6. Feedback
   - Positive and corrective feedback specific to steps of strategy

7. Practice in content materials
   - Materials from regular classroom
   - Generalization of strategy to content material

8. Feedback

9. Post-test
   - Provide information on mastery of strategy

APPENDIX M

RECORDING FORMS FOR INTERRATER RELIABILITY FOR COMPREHENSION

Class_____
in class_____

Name_____

L = label C = comprehension

___1___
___2___
___3___
___4___
___5___
___6___
___7___
___8___
___9___
__10___

Total

___ ___
L C

Name_____

___1___
___2___
___3___
___4___
___5___
___6___
___7___

___8___
___9___
__10___

Total

___ ___
L C

Name_____

___1___
___2___
___3___
___4___
___5___
___6___
___7___

___8___
___9___
__10___

Total

___ ___
L C

APPENDIX N

RECORDING FORMS FOR INTERRATER RELIABILITY FOR SELF-QUESTIONING

Class____
in class____

Questions

Name_____ Name_____

1_____
2_____
3_____
4_____
5_____
6_____

1_____
2_____
3_____
4_____
5_____
6_____

Name_____ Name_____

1_____
2_____
3_____
4_____
5_____
6_____

1_____
2_____
3_____
4_____
5_____
6_____

APPENDIX O

INTERRATER RELIABILITY DATA SUMMARY

Class _____
in class _____

Summary Box

	Label	Comprehension	Questions
Name_____	___	___	___
_____	___	___	___
_____	___	___	___
_____	___	___	___
_____	___	___	___
_____	___	___	___

REFERENCES

Alley, G. and Deshler, D. Teaching the Learning Disabled Adolescent: Strategies and Methods. Denver: Love Publishing Co., 1979.

Anderson, T. H. Another look at the self-questioning study technique. Reading Education Report No. 6, Advanced Research Projects Agency, ED 163441, 1978.

Andre, M. and Anderson, T. The development and evaluation of a self-questioning study technique. Center for the Study of Reading: Technical Report 87, June 1978.

Aschner, M. J. Asking questions to trigger thinking. NEA Journal, 1961, 50, 44-46.

Ault, R. L. and Vinsel, A. Piaget's theory of cognitive development. In R. Ault (Ed.) Developmental Perspectives. Santa Monica: Goodyear Publishing Co., Inc., 1980.

Ausubel, D. P. and Fitzgerald, D. Organizer, general background, and antecedent learning variables in sequential verbal learning. Journal of Educational Psychology, 1982, 53, 243-249.

Bijou, S. W., Peterson, R. F., Harris, F. R., Allen, K. E., and Johnson, M. S. Methodology for experimental studies of young children in natural settings. The Psychological Record, 1969, 19, 177-210.

Bloom, B. S. Taxonomy of Educational Objectives Handbook I: Cognitive Domain. New York: David McKay, 1956.

Bos, C. S. and Filip, D. Comprehension monitoring in learning disabled and average students. Manuscript submitted for publication, 1982.

Brown, A. L. and Palinscar, A. S. Inducing strategic learning from texts by means of informed, self-control training. Topics in Learning and Learning Disabilities, II, 1, April 1982.

Campbell, D. S. and Borich, G. D. A study of text processing and intrinsic individual differences in conceptual organization. Paper presented at the Annual Meeting of the American Educational Research Association, New Orleans, 1973.

Henderson, R. L. and Green, D. R. Reading for Meaning in the Elementary School. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1969.

Herber, H. L. Teaching Reading in Content Areas. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1978.

Hori, A. K. An investigation of the efficacy of a question training procedure on increasing the reading comprehension performance of junior-high school learning disabled students. Unpublished master's thesis. Lawrence: University of Kansas, 1977.

Hunkins, F. P. Using questions to foster pupils' thinking. Education, 1966, 87, 83-87.

Hunkins, F. P. The influence of analysis and evaluation questions on achievement in sixth grade social studies. Educational Leadership Research Supplement, 1968, 1, 326-332.

Hunkins, F. P. Involving Students in Questioning. Boston: Allyn and Bacon, Inc., 1976.

Joyce, B. and Showers, B. Improving inservice training: The messages of research. Educational Leadership, 1980, 37, 379-385.

Kazdin, A. E. Single-Case Research Designs. New York: Oxford University Press, 1982.

Kirk, R. A. Experimental Design: Procedures for Behavioral Sciences. Monterey, California: Brooks/Cole, 1968.

Kirk, S. A. and Elkins, J. Characteristics of children enrolled in the child service demonstration centers. Journal of Learning Disabilities, 1975, 8, 630-637.

LaPorte, R. E. and Voss, J. F. Retention of prose materials as a function of postacquisition testing. Journal of Educational Psychology, 1975, 67, 259-266.

Lerner, J. Learning Disabilities: Theory, Diagnosis and Teaching Strategies. Boston: Houghton Mifflin, 1981.

Lockhart, R. S. and Craik, F. K. M. Levels of processing: A framework for memory research. Journal of Verbal Learning and Verbal Behavior, 1972, 11, 671-684.

Lucking, R. A. A study of the effects of a hierarchically-ordered questioning technique on adolescents' response to short stories. Research in the Teaching of English, 1975, 269-276.

Carin, A. and Sund, R. B. Developing Question Techniques: A Self-Concept Approach. Columbus, Ohio: Charles E. Merrill, 1971.

Carner, R. L. Levels of questioning. Education, 1963, 83, 546-550.

Cole, R. A. and Williams, D. M. Pupil responses to teacher questions: Cognitive level, length, and syntax. Educational Leadership Research Supplement, 1973, 31, 142-145.

Daines, D. Reading in the Content Areas. Dallas, Texas: Scott, Foresman and Co., 1982.

Daines, D. Workshop presentation. Professor, Department of Curriculum and Instructional Sciences, Brigham Young University, Provo, Utah, 1983.

Deshler, D. Workshop presentation. Professor, Department of Special Education, University of Kansas, Lawrence, Kansas, 1983.

Donlan, D. and Singer, H. Active comprehension of short stories. ED 170705, 1979.

Dunkin, M. J. and Biddle, B. J. The Study of Teaching. New York: Holt, Rinehart and Winston, 1974.

Enokson, R. A. A simplified teacher question classification model. Education, 1973, 94, 27-29.

Flavell, J. H. Cognitive Development. Englewood Cliffs, New Jersey: Prentice-Hall, 1969.

Fry, E. A readability formula that saves time. Journal of Reading 11, 1968, 513-516, 534-538.

Gall, M. D. The use of questions in teaching. Review of Educational Research, 1970, 40, 707-720.

Gallagher, J. Expressive thought by gifted children in the classroom. Elementary English, 1965, 42, 559-568.

Gearheart, B. R. Learning Disabilities: Educational Strategies. St. Louis: The C. V. Mosby Co., 1981.

Guilford, J. P. The structure of intellect. Psychological Bulletin, 1956, 53, 267-293.

Guszak, F. J. Diagnostic Reading Instruction in the Elementary School. New York: Harper and Row, 1972.

Hansen, J. and Pearson, P. S. The effects of inference training and practice on young children's comprehension. Technical Report No. 166, ED 186839, 1980.

Manzo, A. The request procedure. Journal of Reading, 1969, 2, 123-126.

Mills, S. R., Rice, C T., Berliner, D. C., and Rosseau, E. W. The correspondence between teacher questions and student answers in classroom discourse. Journal of Experimental Education, 1980, 48, 194-204.

Pearson, P. D. and Johnson, D. D. Teaching Reading Comprehension. New York: Holt, Rinehart & Winston, 1978.

Raphael, T. E. and Pearson, P. D. The effect of metacognitive training on children's question-answering behavior. Technical Report #203. Champaign, Illinois: Center for the Study of Reading, 1982.

Raths, L. E., Wasserman, S., Jonas, A., and Rothstein, A. M. Teaching for Thinking: Theory and Application. Columbus, Ohio: Charles E. Merrill, 1967.

Reid, D. K. and Hresko, W. P. A Cognitive Approach to Learning Disabilities. New York: McGraw-Hill Book Company, 1981.

Rickards, J. P. Processing effects of advance organizers interspersed in text. Reading Research Quarterly, 1976, 11, 599-622.

Robinson, F. P. Effective Study. New York: Harper and Brothers Publisher, 1946.

Ross, A. O. Psychological Aspects of Learning Disabilities and Reading Disorders. New York: McGraw-Hill Book Company, 1976.

Rossi, J. Workshop presentation. Director of Foster Reading Institute, Foster City, California, 1983.

Ryan, T. L. Differentiated effects of levels of questioning on student achievement. Journal of Experimental Education, 1973, 41, 63-67.

Sanders, J. R. Retention effects of adjunct questions in written and aural discourse. Journal of Educational Psychology, 1973, 65, 181-186.

Schallert, D. L. Improving memory for prose: The relationship between depth of processing and context. Journal of Verbal Learning and Verbal Behavior, 1976, 15, 621-632.

Schumaker, J. B., Deshler, D. D., Alley, G. R., Warner, M. M., and Denton, P. H. Multipass: A learning strategy for improving reading comprehension. Learning Disabilities Quarterly, 1982, 5, 295-304.

Schwartz, E. and Sheff, A. Student involvement in questioning for comprehension. Reading Teacher, 1975, 150-154.

Shavelson, R. J., Berliner, D. C., Ravitch, M. M., and Loeding, D. Effects of position and type of questions on learning from prose material: Interactions of treatment with individual differences. Journal of Educational Psychology, 1974, 66, 40-48.

Singer, H. Active comprehension: From answering to asking questions. The Reading Teacher, 1978, 31, 901-908.

Smith, F. Understanding Reading. New York: Holt, Rinehart & Winston, Inc., 1978.

Smith, N. B. Reading Instruction for Today's Children. Englewood Cliffs, New Jersey: Prentice-Hall, 1963.

Spache, G. A new readability formula for primary grade materials. Elementary School Journal, 1953, 53, 410-413.

Sund, R. B. Piaget for Educators: A Multi-media Program. Columbus: Ohio: Charles E. Merrill, 1976.

Taba, H. The teaching of thinking. Elementary English, 1965, 42, 534-542.

Torgesen, J. K. The roles of nonspecific factors in the task performance of learning disabled: A theoretical assessment. Journal of Learning Disabilities, 1977, 10, 27-34.

Torgesen, J. K. Conceptual and educational implications of the use of efficient task strategies by learning disabled children. Journal of Learning Disabilities, 1980, 13, 19-26.

Watts, G. H. and Anderson, R. C. Effects of three types of inserted questions on learning from prose. Journal of Educational Psychology, 1971, 62, 387-394.

Wong, B. Y. The role of theory in learning disabilities research. Journal of Learning Disabilities, 1979a, 12, 88-92.

Wong, B. Y. Increasing retention of main ideas through questioning strategies. Learning Disabilities Quarterly, 1979b, 2, 42-47.

World Book Reading Development Program. Readers Digest Educational Division (Eds.) Pleasantville, New York: Readers Digest Services Corporation, 1981.